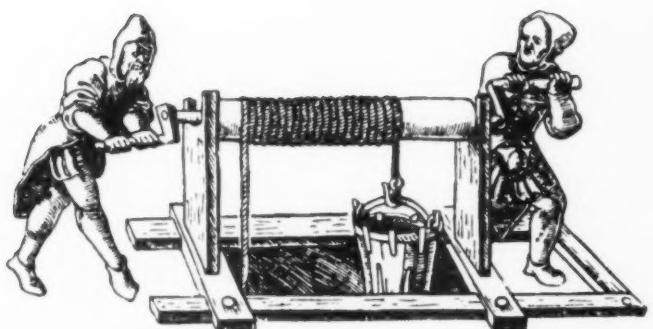


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# MINING WORLD



A P R I L 15 , 1958

# WEMCO World Standards in Mineral Processing...

## FLOTATION • HEAVY MEDIA • GRAVITY CONCENTRATION EQUIPMENT

### FEATURES

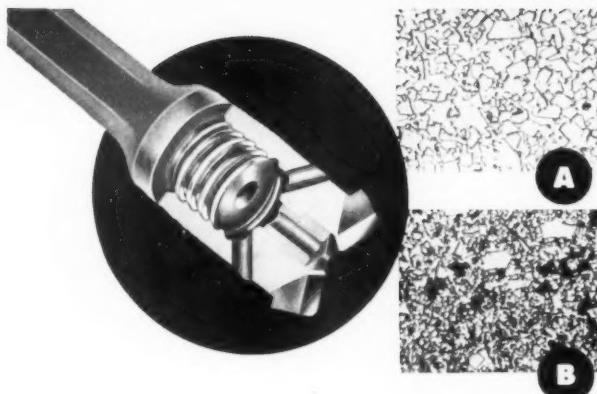
### SPECIFICATIONS

	<b>WEMCO MOBIL-MILL</b>	Widely used for profitable production of marketable concentrates and low cost elimination of waste in treating metallic minerals, industrial minerals, coal and aggregate. Pre-engineered and pre-fabricated for maximum flexibility. Incorporates Wemco Drum type and Cone type separators for most accurate separations and highest recoveries.	Specific Gravity Range: 1.25 to 3.40 Capacity: 5 to 500 TPH Separatory Vessel: Cone Single Drum, Double Drum, 2 - Compartment Drum.
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	<b>WEMCO SPIRAL CLASSIFIERS</b>	Slime-sand separations from 28 to 325 mesh. Single, double or triple spirals; tank options from straight side to full flare for desired settling area. Hydraulic lifting device available for starting under load without tank drainage. Sealed bearings, replaceable wearing shoes, continuous welded steel tube shaft assures long life.	Spiral Diameter: 12" to 90" Tank: Length: 6' to 48" Raking Capacity: 5 to 24,000 TPD Wearing Parts: Alloy iron, stainless steel or rubber covered.
	<b>WEMCO REMER JIGS</b>	Ideal for concentration of large tonnages of ores where specific gravity differential exists and ratio of concentration is low. Provides exclusive differential acceleration — combined high and low frequency strokes — with live jig bed over entire surface.	Type: 2 hutch, 3 hutch Sizes: 5'x11' to 5'x16' Capacity: 30 TPH to 60 TPH per unit
	<b>WEMCO ATTRITION MACHINES</b>	Produce efficient inter-particle impingement in dense pulps of 65% to 80% solids, for scouring pulp grains, removing organic coatings or previously used reagents. Reverse propeller blade action for top pulp mixing with minimum contact time.	Cell Sizes: 10 or 20 cu. ft. Wearing Parts: Alloy iron, stainless, rubber or neoprene covered. Capacity: 5 to 100 TPH
<b>WEMCO PUMPS</b>			
	<b>WEMCO DIAPHRAGM PUMP</b>	Widely used for handling dense pulp, sludges and other fluids with solids which wear or clog other pumps. Ideal for control of hydroseparator and thickener underflow. Adjustable speed and stroke. Fast takedown and replacement of parts.	Sizes: 2" to 4" Simplex Duplex Capacity: 5 to 100 GPM Construction: Fine grained iron, rubber valve seat stainless steel or rubber covering.
	<b>WEMCO SAND PUMPS</b>	Handles pulps of sands, abrasive solids, slimes, slurries and heavy media; pumps flotation feed, concentrates and tailings. Used for HMS circuits, screen products and grinding mill discharge to classifiers. Change of wearing parts made readily.	Sizes: 1 1/4" to 8" Capacity: 20 GPM to 22 GPM Discharge Head: Up to 10 Ft. Pulps Handled: Up to 65% solids, particles up to 1"
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**A**

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**B**

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	1/8" F													
	1" H	1 1/2	1 1/8	1 1/4	1 1/2									
	1-31/64" D					2	2 1/8	2 1/4	2 1/2	2 1/4	3			
	1-11/16" K										3	3 1/2	4	4 1/2
	1 1/4" Rope					1 1/8	2	2 1/4	2 1/2					
	1 1/2" Rope								2 1/2	2 1/4	3	3 1/2	4	
	2" Rope										3 1/2	4	4 1/2	5
	400						2	2 1/4	2 1/2					
	600								2 1/2	2 1/4	3	3 1/2		

Shaded area indicates X-Bits

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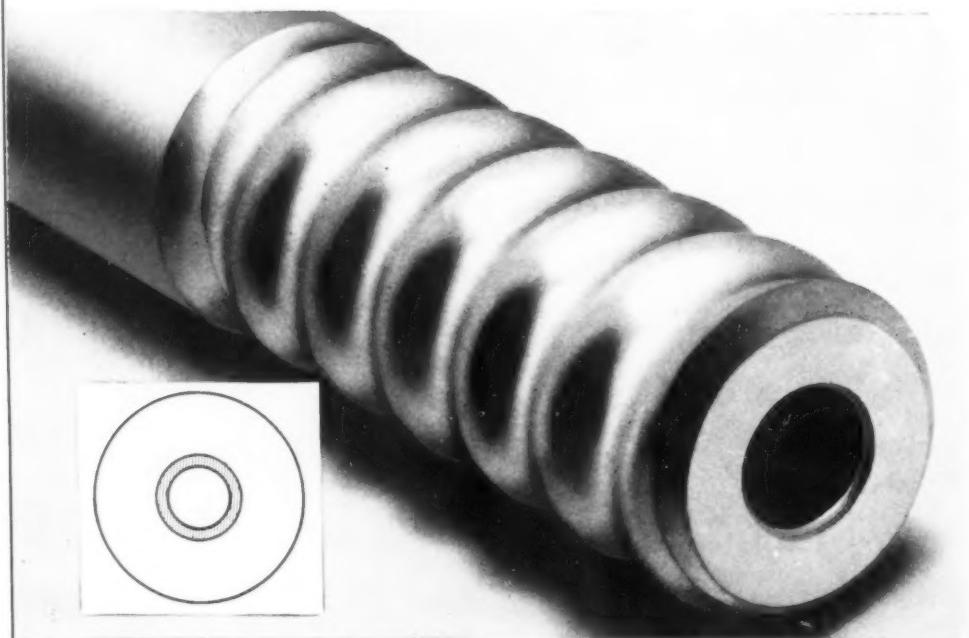
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# THE ATLAS COPCO LION

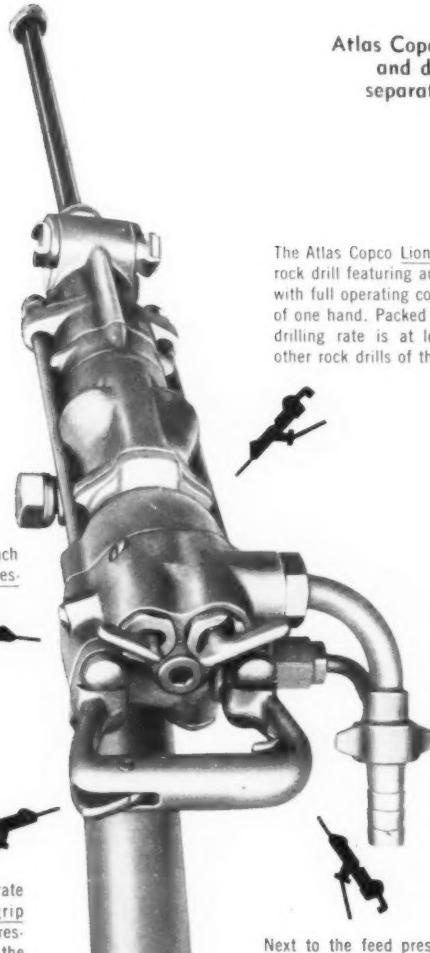
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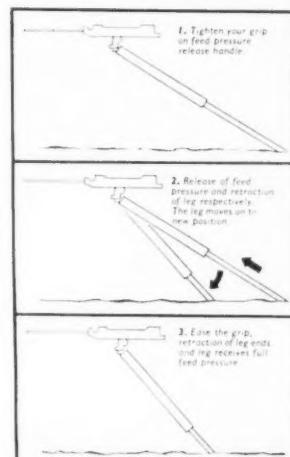
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AR4*	450	795	146	725
AR5	360	960	177	850
AR7	327	1710	314	1500
AR9	300	3220	588	2900

\*Portable skid-mounting available for semi-permanent installations.



# MINING WORLD

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### ON THE COVER

Hoisting in 1546, pictured by Georgius Agricola, shows a two-man windlass over a shallow shaft. Mining has changed. Check the catalog section of this issue for the latest equipment available in 1958.

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# COST CUTTING EQUIPMENT

AKINS CLASSIFIERS AND HEAVY MEDIA SEPARATORS

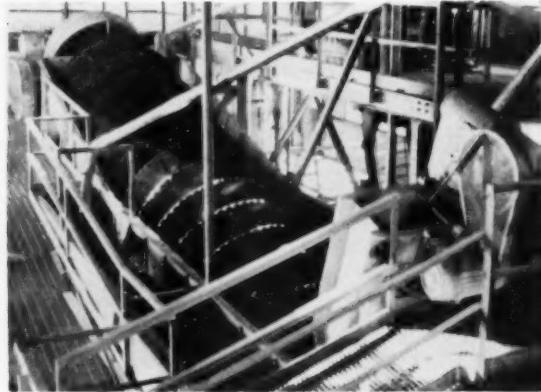
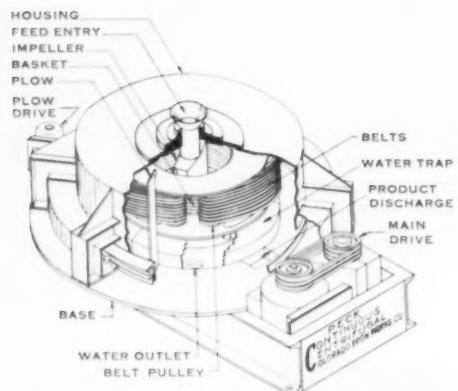


The Akins Classifier was originally developed, in 1908, for use in closed circuit with a ball mill. Its outstanding success led to many other profitable applications where it has demonstrated its superiority... dewatering and recovering fine solids; sand and slime separations; washing coal, sand, and oyster shell; desliming and de-oiling phosphate

#### NEW COLORADO IRON WORKS PECK CONTINUOUS CENTRIFUGAL

##### For dewatering . . .

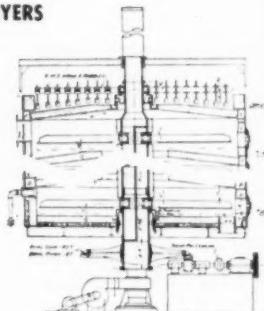
- Industrial, Foundry and Glass SANDS
- Fine COAL
- Crystalline CHEMICAL products
- Non-metallic and metallic MINERAL CONCENTRATES



rock and concentrate; sink-float concentration; and many others. The Akins is made in sizes up to 84", simplex and duplex, in two types—small and large settling pool. The Akins Heavy-Media Separator is the only unit available which can make a 3-product separation in one machine from one medium cleanup circuit.

#### SKINNER ROASTERS AND DRYERS

For roasting, calcining, and drying ores, clays, limestone, limestone mud, flotation concentrates; decomposing oil sludge in the process of recovering sulphuric acid. Coal, oil or gas fired. Sizes to 23'6" inside diameter; up to 12 hearths.



#### REPRESENTATIVES

##### Licensed Manufacturers and Sales Representatives:

Canadian Locomotive Co., Ltd., Kingston, Ont., Canada  
John Carruthers & Co. (Pty.), Ltd., Sydney, Australia  
Head, Wrightson & Co., Ltd., Stockton-on-Tees, England  
Head, Wrightson & Co., S. A. (Pty.), Ltd., Johannesburg

##### Sales Agents:

Andrews and George Co., Inc., 5 Shiba Park, Tokyo, Japan  
Edw. J. Nell Co., Manila, P. I.  
Continental Sales and Equipment Co., Hibbing, Minnesota  
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# COLORADO IRON WORKS CO.

DENVER, COLORADO

A SUBSIDIARY OF THE MINE & SMELTER SUPPLY CO.

# Your library for better pumping

## abrasives corrosives acids

Gives easier way to select the proper type and size of pump ...

### Flex-Check RUBBER-LINED Valves

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### PACKLESS RUBBER-LINED PUMPS

for abrasives, corrosives, acids  
Brochure  
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for abrasives  
Brochure  
No. 457

### Technical Data

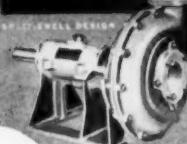
### HYDROSEAL CENTRISEAL PACKLESS CENTRIFUGAL PUMPS



ALLEN-SHERMAN-HOFF PUMP CO.  
259 E. Lancaster Ave., Wynnewood, Pa.  
Manufactured throughout the World

for abrasives

### HYDROSEAL RUBBER-LINED pumps



Centriseals deliver pulp  
undiluted

### CENTRISEAL RUBBER-LINED pumps



for abrasives, corrosives, acids

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for abrasives

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With the 16-page Technical Data book, one or more of these Brochures will benefit you. Write for your selection by number.

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Dept. J 259 E. Lancaster Ave., Wynnewood, Pa.

Representatives throughout the World

# HYDROSEAL

M A X I M I X R U B B E R P R O T E C T E D

# and CENTRISEAL

SAND, SLURRY & DREDGE PUMPS



*This Bucyrus-Erie 150-B is loading iron ore into end-dump trucks in a pit on the Mesabi Range.*

## CUT THE COSTS YOU CAN CONTROL with Bucyrus-Erie Electric Shovels

The big capacity, rugged strength and long-life service built into Bucyrus-Erie electric shovels can help hold down digging and loading costs in your pit.

Years of service in every type of mine have proved the outstanding design features of these machines. Their sturdy front-end construction — with exclusive two-section boom, tubular dipper stick and twin dual hoist — provides plenty of strength, reduces dead-weight, enables these shovels to handle big yardages economically. Bucyrus-Erie-improved Ward Leonard electric control provides fast acceleration and deceleration, extra torque and responsive power to speed work cycles. Strength and durability throughout assures efficient performance for profitable operations over a long period.

Let us give you complete information on these and other features of Bucyrus-Erie electric shovels and show you how they can help you control costs in your pit.

147L57C



*A Familiar Sign...  ...at Scenes of Progress*

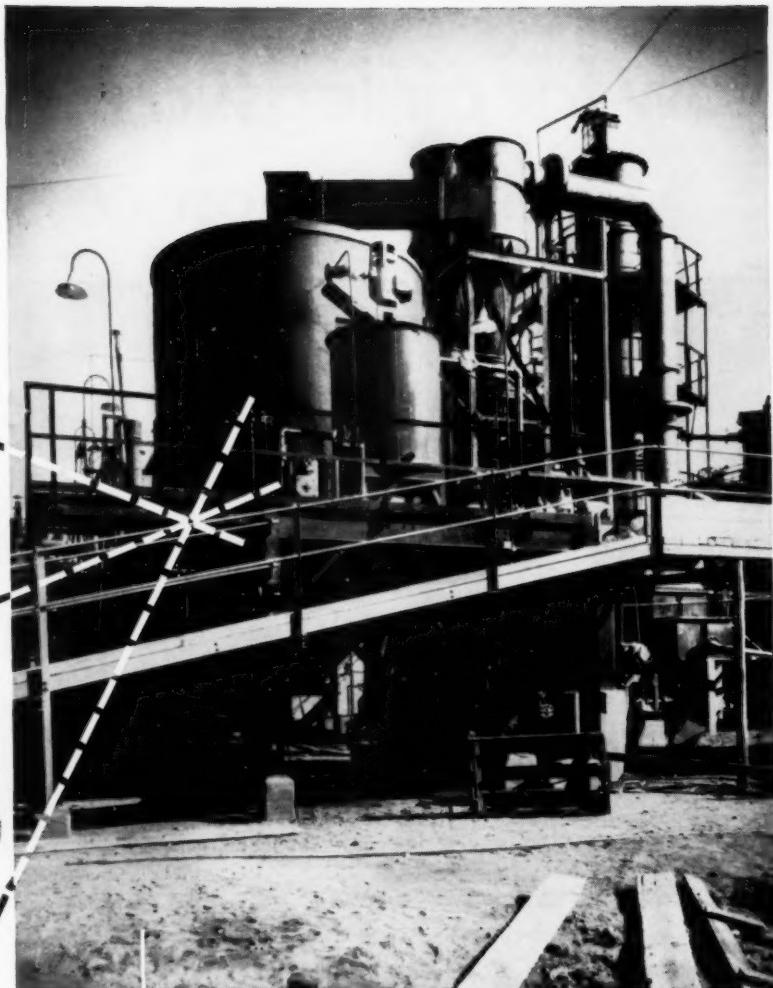
BUCYRUS-ERIE COMPANY • SOUTH MILWAUKEE, WISCONSIN

MINING WORLD



**AROUND  
THE CLOCK**

**A  
TANK CAR  
AN HOUR  
OF  
 $H_2SO_4$ .**



This FluoSolids System at West Rand Consolidated Gold Mines, Ltd. on South Africa's fabulous Witwatersrand was started up early in 1952. The first of several to go into operation on the Rand, it was also the first in the world to combine FluoSolids roasting of pyrite with a contact acid plant.

Over 1650 tons of  $H_2SO_4$  — enough to fill twenty-four tank cars — are being produced every day for uranium leaching at seven South African mills.

An important part of each of these installations is a Dorrco FluoSolids System. Cumulatively the Systems include nineteen Reactors, of which sixteen were on original order and three on repeat orders, plus additional Dorr-Oliver and auxiliary equipment to produce a high strength  $SO_2$  gas for acid manufacture by conventional contact acid plants.

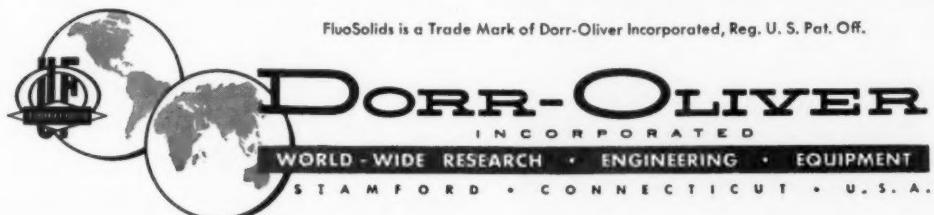
Total feed to the Systems is 1450 tons per day of pyritic gold mill tailings — averaging 35 to 45%

total sulfur, gas production is 75,000 to 82,000 SCFM. Gas strength averages 12 to 13%  $SO_2$  . . . sulfur recovery approximately 90%.

The efficiency and economics of the Dorrco FluoSolids System is in evidence in these facts. Additional representative proof that the FluoSolids process can produce an  $SO_2$  gas at lower investment and operating costs than other roasters.

If there's a step in your flowsheet where intimate contact between solids and gases is essential, fluidization should be investigated. Just drop a line to Dorr-Oliver Incorporated, Stamford, Connecticut.

FluoSolids is a Trade Mark of Dorr-Oliver Incorporated, Reg. U. S. Pat. Off.



# Now for air legs! a removable bit that's one-piece strong!



Here is a removable bit for air-leg drills that has the strength of one-piece steels. It's the new Timken® tapered socket bit. The tapered union gives you all the advantages of removability and a strong secure union for use with air-legs.

Because the new Timken tapered bit is removable, you get all these advantages that intraset steels can't provide:

You don't have to throw away the drill steel just because the carbides wear out. You do with intrasets.

You carry a few bits down into the mine instead of a load of steel. You can't with intrasets.

You can quickly change bit gauge sizes using the same steel. You can't do this with intrasets.

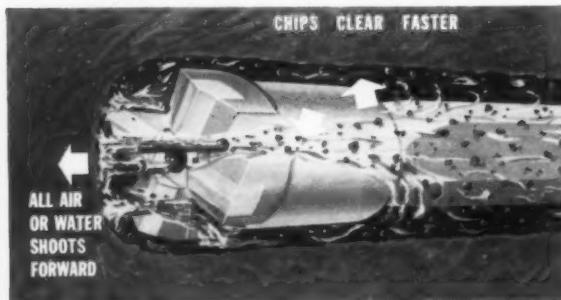
You don't have to lug the whole steel back just to

resharpen the cutting edges. You do with intrasets.

You get four carbide cutting edges. You get only two with chisel intrasets.

And the new frontal design of the Timken tapered bit gives you faster chip clearance because 1) new five front holes shoot water or air directly against the rock face and 2) new deeper, wider wing clearance lets chips wash back faster. New special-analysis carbide inserts give superior wear-resistance with added shock-resistance, can be reconditioned many times.

For removability and strength, use the air-leg bit of the future. Write for our free brochure. The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable: "TIMROSCO".



# TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

**AVAILABLE NOW...**  
**THE AIR-LEG BIT OF THE FUTURE**



Lima Type 2400 Dragline equipped with 135-ft. boom and torque converter at work on coal stripping operation near Nesquehoning, Pa. Machine is one of the 15 Limas owned and operated by Fauzio Brothers.

## "Nothing beats a LIMA for 'round the clock dependability" *(Pat Fauzio Fauzio Bros.)*

As one of the major stripping contractors in the hard coal region, Fauzio Brothers, Nesquehoning, Pa., count heavily on the ruggedness of their equipment. Day and night their Limas are on the job.

Pat Fauzio says: "We bought our first Lima shovel back in 1937. It did so well that we have purchased 20 Lima machines since, and have 15 working for us at the present time. I'm glad to report that the original Lima is still producing—a real tribute to its engineering and construction. Not only have these machines stood up to a lot of hard work, but they have been run by many different operators

over the years—a real test of ruggedness. In our experience, nothing beats a Lima for 'round the clock dependability.

"One of the prime reasons for our purchase of Limas is the people back of the equipment—the men at Lima and at our distributor's. They always have given us excellent service on short notice."

There's a type and size of Lima that can speed your stripping and loading operations for greater profit. It will pay you to get the complete details from your nearby Lima distributor. Or write to Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD  
Cable Address: LIMASHOVEL, Lima, Ohio, U.S.A.

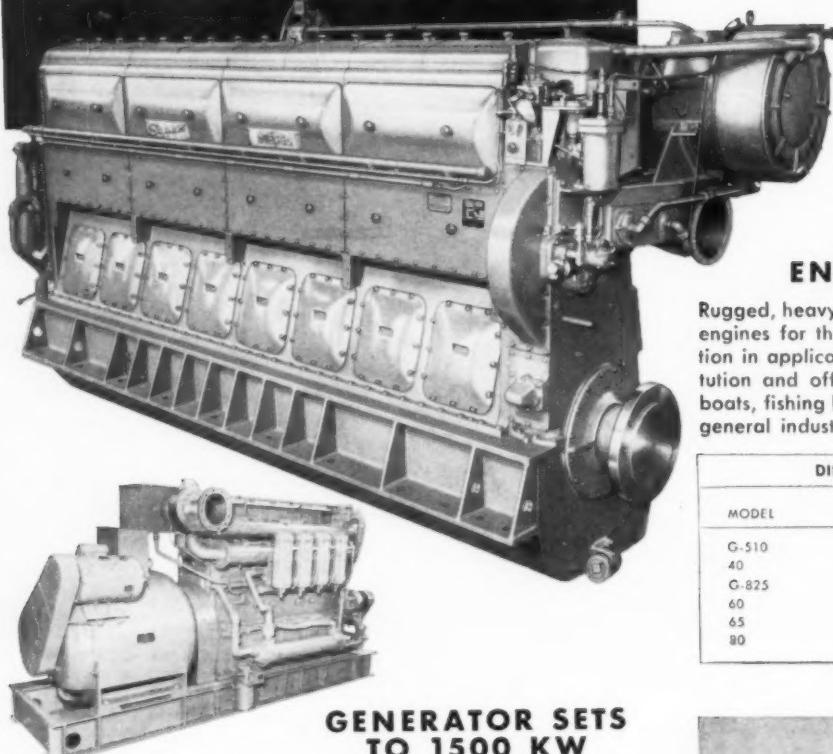
**LIMA** Construction Equipment Division, Lima, Ohio  
**BALDWIN · LIMA · HAMILTON**  
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Shovels • Cranes • Draglines • Pullshovels • Roadpackers • Crushing, Screening and Washing Equipment



# White SUPERIOR and ATLAS ENGINES

DIESEL • DUAL FUEL • GAS 100 to 2150 H.P.



## GENERATOR SETS TO 1500 KW

Standard or custom-built electric generator sets for your application. Diesel, dual fuel or gas engines. 150 to 1500 KW.

STANDARD A.C. GENERATOR SETS • DIESEL or DUAL FUEL ENGINES						
MODEL	RPM	BHP	KW	ENGINE HEIGHT	APPROXIMATE DIMENSIONS ENGINE WIDTH	ENGINE & GENERATOR LENGTH
40-S-6	600	225	150	69½"	47¾"	171¾"
40-S-6	720	290	200	69½"	47¾"	171¾"
40-S-6	900	360	250	69½"	47¾"	171¾"
40-SX-6	900	430	300	71½"	47¾"	174½"
40-SX-6	900	505	350	71½"	47¾"	177⅞"

STANDARD A.C. GENERATOR SETS • NATURAL GAS ENGINES						
MODEL	RPM	BHP	KW	ENGINE HEIGHT	APPROXIMATE DIMENSIONS ENGINE WIDTH	ENGINE & GENERATOR LENGTH
6G-510	720	225	150	65½"	45¾"	149½"
6G-510	900	325	200	65½"	45¾"	155"
6G-825	720	375	250	70"	61"	171¾"
6G-825	900	450	300	70"	61"	171¾"

Standard generator voltage may be 120/208, 127/220, 240, 480 or 600. Custom-built sets 150 to 1500 KW.

CALL, WIRE OR WRITE FOR COMPLETE INFORMATION

*Superior*  
ENGINES

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*Industrial*  
DIESEL  
ENGINES

*White*  
DIESEL

# for INDUSTRIAL, MARINE and OIL FIELD SERVICE

## ENGINE POWER UNITS

Rugged, heavy-duty, high-quality, 6 and 8 cylinder, 4-cycle engines for the most dependable and economical operation in applications such as: municipal, public utility, institution and office building power plants; oil fields, work boats, fishing boats, dredges, quarries, power shovels and general industrial service.

DIESEL, DUAL FUEL and GAS ENGINES			
MODEL	FUEL	CONTINUOUS H.P. RANGE	CONTINUOUS R.P.M. RANGE
G-510	G	190-400	600-1200
40	D, DF	215-1025	600-1100
G-825	G	300-705	600-900
60	D, DF	410-1325	400-514
65	D, DF	580-2150	500-600
80	D, DF, G	600-2000	300-375

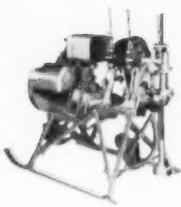
D—Diesel; DF—Dual Fuel; G—Gas



## MOBILE ELECTRIC GENERATING PLANTS

Completely self-contained powerhouse on wheels. 350 KW, 500 KW, 1000 KW and 1250 KW for base power, emergency or supplementary power wherever needed.

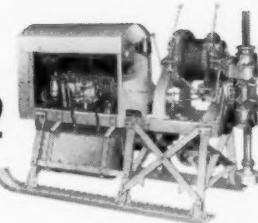
**WHITE DIESEL ENGINE DIVISION**  
THE WHITE MOTOR COMPANY  
Plant and General Offices: 1403 Sheridan, Springfield 99, Ohio  
Phone: FAIRFAX 3-4921  
EXPORT OFFICES: 415 Madison Avenue, New York 17, N.Y. Cable: Superdies

**BBS-1**

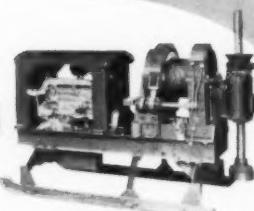
World's best known surface drill. Handles "E" Rods to 1,500 ft., "A" to 1,100 ft.

**x-ray**

Compact, portable—185 lbs. net. Takes  $\frac{3}{4}$ " or  $\frac{7}{8}$ " core to 200 ft. Low fuel consumption.

**BBS-2**

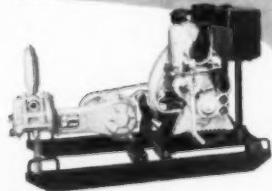
Versatile, choice of 5 swivelheads. Depths to 3,500 ft. Gas or diesel.

**BBS-3**

Strong, speedy unit for deep drilling . . . 4,600 ft. with "A" or "B" Rods, 95 h.p. diesel.

## if it's for diamond drilling

**we make it!**

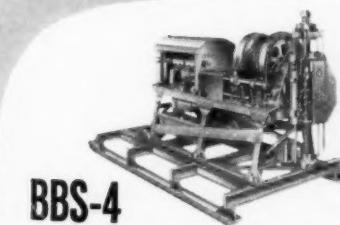
**drill pumps**

5-12 and 4-7 models. Capacities 400 to 1,200 g.p.h. Diesel motor optional.

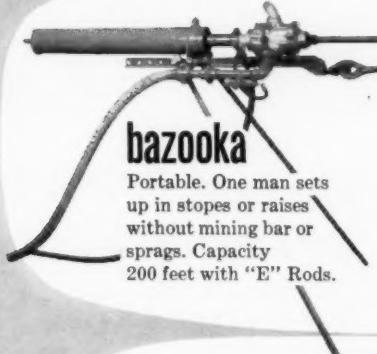
**permaset  
bits**

(Powdered metal)

All standard sizes available from stock. Also reaming shells, etc.

**BBS-4**

Drills to 5,000 ft. with "B" Rods. Moves under own power, gas or diesel.

**bazooka**

Portable. One man sets up in stopes or raises without mining bar or sprags. Capacity 200 feet with "E" Rods.

**JV**

4 feed swivelhead. Capacity 800 ft. with "E" Rods. JVR with right-hand feed screw for blastholes.

**BBU-2**

Rugged. Capacity 1,800 ft. with "E" Rods, 1,400 ft. with "A", four gear speeds.

**VEG**

Vane motored version of J.V. Lightweight, compact construction.

Can be speedily dismantled into two units.



**BOYLES BROS**  
DRILLING COMPANY LTD.  
VANCOUVER, CANADA

BOYLES BROS. DRILLING CO. LTD., NEWCASTLE-ON-TYNE, ENGLAND • BOYLES BROS. (PTY.) LTD., JOHANNESBURG, SOUTH AFRICA  
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FORMAC S.A., RIO DE JANEIRO, BRAZIL • HAEHRE AND COMPANY, A/S, OSLO, NORWAY • ITEC, S.R.L., BUENOS AIRES, ARGENTINA  
JOHANSSON & CIA., S.A., LA PAZ, BOLIVIA • SHIRO TRADING COMPANY S.A., TOKYO, JAPAN • TRILLIANCE ENGINEERING CO., BOMBAY, INDIA • WIESE AND CA. LDA., LISBON, PORTUGAL.



## Roof Bolting at the Face Minimizes Danger of Rock Falls

When you install Bethlehem Pacific headed or slotted roof bolts at the face, using a predetermined pattern, the mine roof becomes safer, less likely to fall. The roof bolts lock themselves in drilled holes, anchoring the strata into a thick, self-supporting beam.

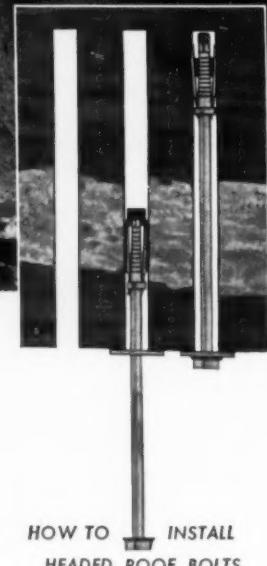
With such a roof bolting installation, wider openings and clearances are possible. And because there are no bulky supports, mechanized equipment can be maneuvered easily, even right up to the face. Besides, there's no fire hazard involved.

Bethlehem Pacific headed roof bolts are furnished in three types:

1.  $\frac{3}{4}$ -in. high-strength; typical breaking load 34,000 lb.
2.  $\frac{5}{8}$ -in. high-strength; typical breaking load 24,000 lb.
3.  $\frac{7}{8}$ -in. high-strength; typical breaking load 45,000 lb.

Bethlehem Pacific slotted roof bolts are of 1-in. diam; typical breaking load 45,000 lb.

We would be happy to give you further information about Bethlehem Pacific mine roof bolts. Just contact our nearest sales office.



**BETHLEHEM PACIFIC COAST  
STEEL CORPORATION**

Sales Offices: Phoenix, Los Angeles, San Francisco,  
Spokane, Seattle, Portland



**BETHLEHEM PACIFIC**



## *High altitudes, narrow work areas severely test this Michigan, yet every day it loads **400 tons** of rock weighing **5,400 lbs per yd.***

High in the Rocky Mountains of Montana, U.S.A., Cummings-Roberts Company has one of the toughest rock-loading jobs you could find anywhere.

Part of the time, they blast and load mountain-top granite . . . summer and early fall, they load fluorspar. As you know, the granite overburden alone would severely test *any* loader. Fluorspar, however, is even worse. A heavy rock mineral, it weighs 5,400 pounds per cubic yard—over 850 lbs more per yard than in-bank granite (and 2,200 lbs more than pit-run gravel).

### **Increases efficiency**

Over the years, Cummings-Roberts has tried just about every kind of loader made. Last year to increase efficiency, their Michigan Distributor suggested a Model 175A Michigan Tractor Shovel. "Frankly," Cummings-Roberts officials told them, "we don't believe *any* rubber-tired unit can load the material efficiently. But we'll give it a try."

Result? John Taber, General Superintendent, wouldn't let them take the Michigan off the job.

Today, the 133 hp 2½ yard Michigan handles *all* loading of the super-heavy fluorspar. Production, with trucks on 600

ft one-way hauls to crushing mill, averages 400 tons per 7-hour day. Production of the granite overburden, with trucks on 2,000 ft one-way hauls, averages 500 tons per day.

### **Downtime negligible**

With all this rugged loading of super-heavy material, plus repeated back-and-forth maneuvering on narrow benches, plus continuous work at high 7,000 ft altitudes, the torque converter equipped Michigan has posted an excellent mechanical record. *To date, it has had only one minor breakdown!*

### **Also tows compressors, speeds other odd jobs**

Operator Don Lindblom likes Michigan's ease of operation, says it takes

only half-an-hour per day to refuel and lubricate. Foreman Waino Lindblom adds, "We particularly like Michigan's truck-like speed in moving from level to level." This mobility gives the Michigan some "spare time" to handle maintenance jobs scattered along 15 miles of mountain roads—cleaning rock off benches so trucks and wagon drills can get through . . . hauling air compressors . . . digging culverts . . . even plowing snow.

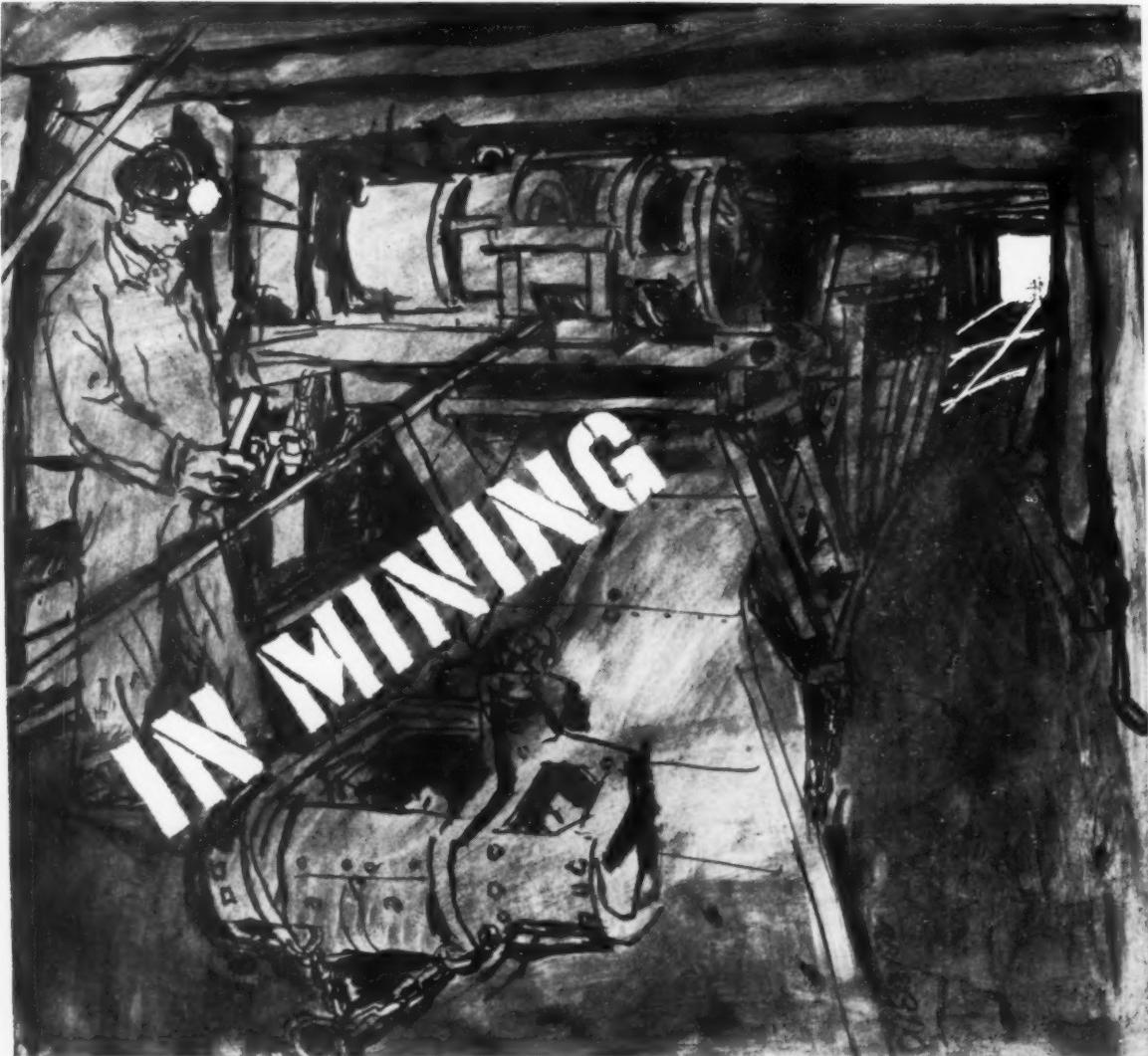
If your job involves similar scattered maintenance, or similar loading of heavy materials, or similar tough working conditions, you too may be able to improve efficiency with a Michigan Tractor Shovel. To prove it, your Michigan Distributor will be glad to show you a Michigan Tractor Shovel in action. Phone him or write us for details.

Michigan is a registered trademark of  
**CLARK EQUIPMENT COMPANY**

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Construction Machinery Division  
2493 Pipestone Road, Benton Harbor, Michigan  
In Canada: Canadian  
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**NOTHING TRANSMITS POWER WITH THE FLEXIBILITY OF ROEBLING ROYAL BLUE WIRE ROPE.** This, and its exceptional resistance to abrasion, shock and corrosion attack, make Royal Blue the strongest and safest wire rope you've ever used. On any comparative cost basis, nothing matches it as an instrument for transmitting power. For details on the real meaning of long service life, contact your nearby Roebling Distributor, or write Wire Rope Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.



**ROEBLING**   
Branch Offices in Principal Cities  
Subsidiary of The Colorado Fuel and Iron Corporation

# MCLANAHAN EQUIPMENT

## for Mines, Pits and Quarries

Widely recognized as standards of efficiency and dependable service, McLanahan equipment is on duty the world over.

### Other McLanahan Equipment Not Illustrated

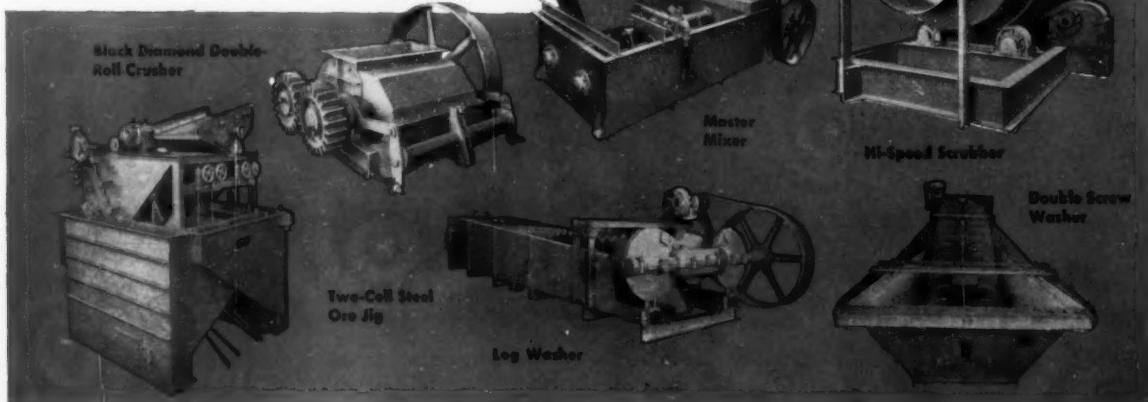
- Conveyors
- Dryers of Revolving Type
- Dry Pans, Super Heavy Duty
- Elevators
- Super Black Diamond and Pioneer Crushers
- Portable and Semi-Portable Crushing Plants
- Scrap Bundlers
- Mixers and Blenders
- Hoists
- Special Machinery

Descriptive bulletins are available on the equipment shown here. Write for copies today.

## MCLANAHAN & STONE CORPORATION

HOLLIDAYSBURG, PENNSYLVANIA

PIT, MINE AND QUARRY EQUIPMENT  
HEADQUARTERS SINCE 1835





"Modern Copper Concentrator at Silver Bell, Ariz., for American Smelting & Refining Company"

## FROM START TO START-UP

Planning for successful operation begins with preliminary designs and cost estimates. From start to production, assign Stearns-Roger the task—one order, one responsibility for design, engineering, procurement and construction. For new plant or modification,

TAKE IT UP WITH...

**Stearns-Roger**  
THE STEARNS-ROGER MFG. CO. • DENVER, COLORADO

DENVER • HOUSTON • SALT LAKE CITY • EL PASO  
Stearns-Roger Engineering Company, Ltd., Calgary, Alberta

# 27 ton "EUC" REAR-DUMP

*It's new...but  
JOB PROVED!*



**325 or 335 h.p....Torqmatic Drive...18.00 x 25 tires**

Model R-27 is a new size in the complete line of Euclid Rear-Dumps—rated payload is 54,000 lbs. This off-highway hauler incorporates the job-proved components which have made Euclid Rear-Dumps the outstanding choice of contractors, mines and quarries.

With either 325 h.p. GM diesel or 335 Cummins engine, Allison Torqmatic Drive makes maximum use of the power for faster hauling cycles. Converter lock-up in the 4-speed Torqmatic permits 34 mph speed with full payload and efficient performance on long, high speed hauls.

Standard 18.00 x 25 tires on all four wheels assure the traction and load carrying capacity needed for moving 27-ton payloads on tough hauls. Standard body is rated at 18 cu. yds. struck —quarry type body is also available. The R-27 is equipped with oil retarder for safer, more economical braking on jobs with steep down-grades on the loaded haul.

See your Euclid dealer for detailed specifications on this new 27-ton Rear-Dump...it's a good example of the advanced design that makes Euclid your best equipment investment.

EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

**A complete line of Rear-Dumps—10, 15, 18, 22, 27, 40 and 50 ton capacities,  
also semi-trailer models of 12, 22 and 35 ton payload—to fit any job.**



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EUCLID (GREAT BRITAIN) LIMITED • Newhouse, Lanarkshire, Scotland

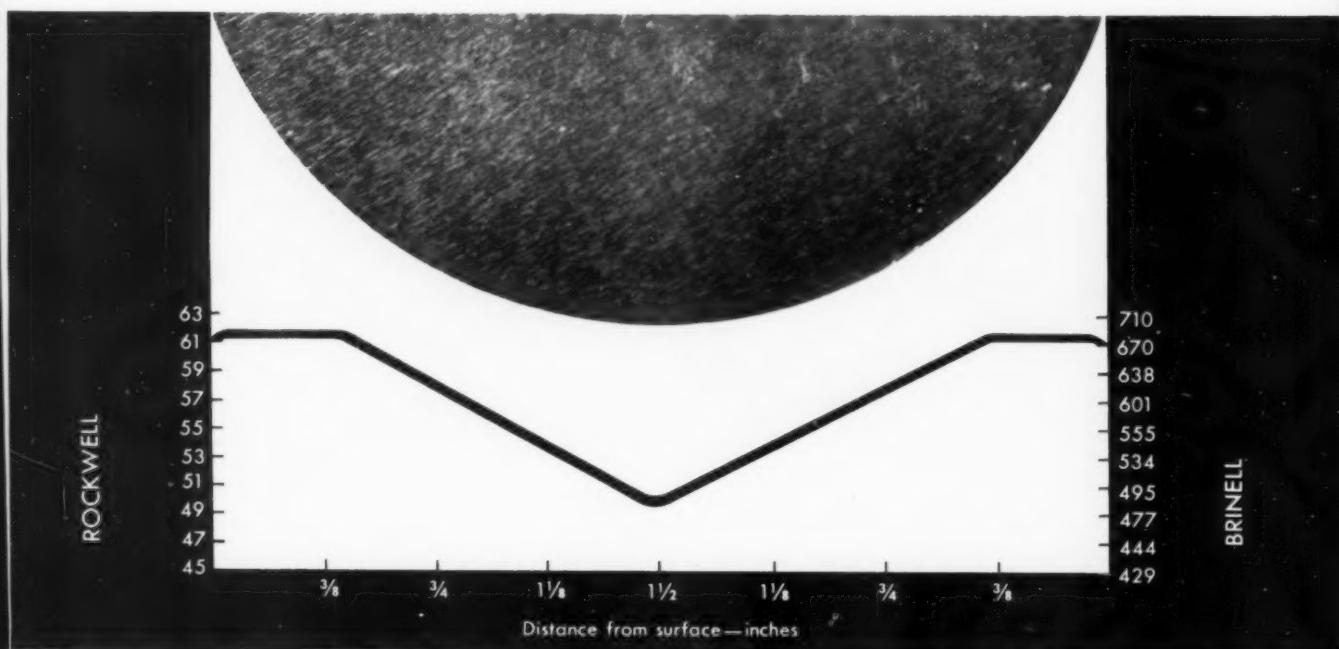
**EUCLID PRODUCTS**



controlled metal hardness means  
heat-treated cast alloy steel

# NACO GRINDING BALLS

cut per-ton grinding costs



Note how new casting process and full heat treatment show controlled hardness between surface and inner core.

Spectrographic analytical control of elements in steel making processes and controlled heat treatment assure the desired metallurgical grain structure which produce the type of hardness required for maximum wearing qualities.

Performance reports on Naco solid cast alloy steel grinding balls from mills now using them have been universally favorable—both in lasting qualities and impact absorption.

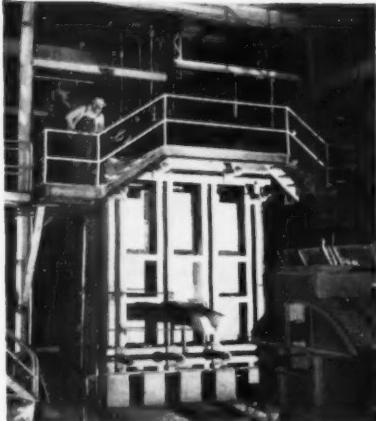
Structurally, they possess a grain

closely approaching tool steel—tough, hard and rugged for long lasting qualities. Laboratory tests show a remarkable uniformity in solidity, both under X-ray and specific gravity tests, with controlled hardness holding to a desired depth.

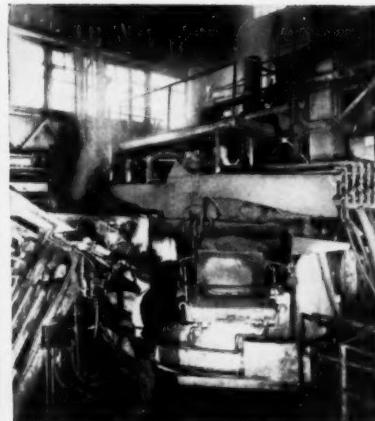
A.A. 5059



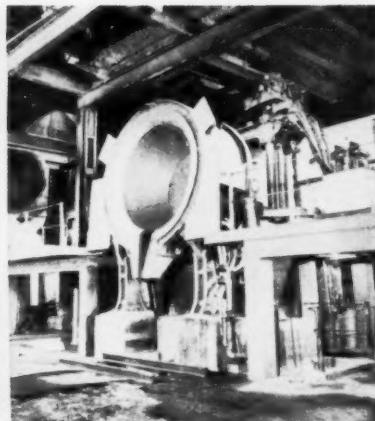
CAPITOL FOUNDRY DIVISION  
**NATIONAL MALLEABLE and STEEL CASTINGS COMPANY**  
Post Office Box 750, Phoenix, Arizona  
GENERAL OFFICES • CLEVELAND 6, OHIO  
Established 1868



Matte and Speiss Smelting



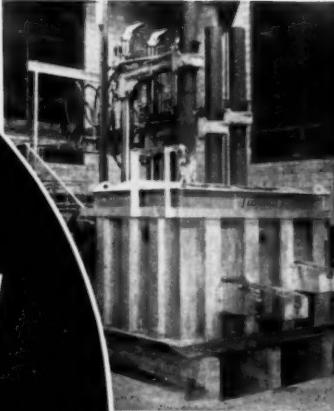
Copper Melting



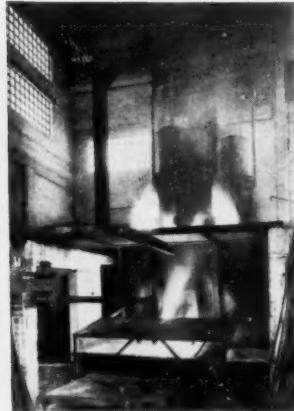
On Low Carbon Ferro-Alloys

# Lectromelt<sup>\*</sup> Furnaces really get around—

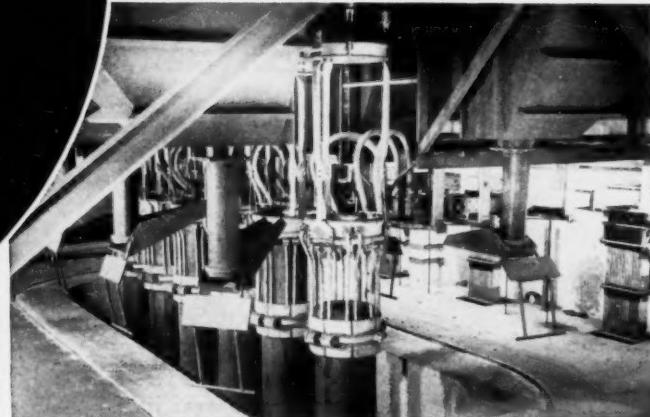
Catalog No. 105 describes furnaces for Smelting and Refining. For a copy, write Lectromelt Furnace Division, McGraw-Edison Company, 324 32nd Street, Pittsburgh 30, Pennsylvania.



Pilot Plant Research



Ferro-Alloy Smelting



"Six-in-line" Smelter

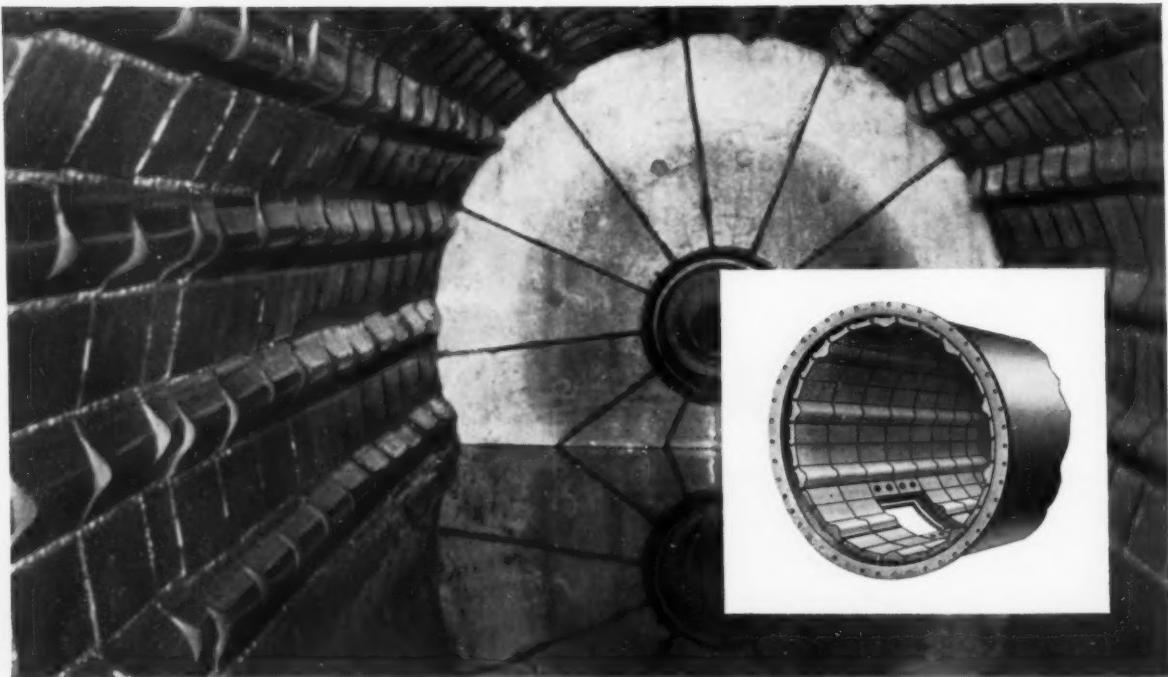


\* Reg. Trademark U.S. Pat. Off.

## LECTROMELT FURNACE DIVISION

McGRAW-EDISON COMPANY

Pittsburgh 30, Pennsylvania



# 8

## Reasons Why You Should Standardize with B&W Universal Liner Plates

### Better Performance with Lower Costs— Same Casting Fits All Mill Sizes

B&W Tube Mill Liners reduce capital, time and labor costs. Consequently, they reduce the cost of the material ground. Here are eight reasons why:

1. Lower Initial Costs—standardization eliminates chiller and pattern costs.
2. Longer Life For Liners—better quality control on a mass production casting, utilizing permanent molds, results in uniform wear. Ideal size for uniform chill and heat-treatment.
3. Longer Life for Different Applications—this is assured by selection of proper materials. Design is suitable for either chilled irons or wear steels.
4. Reduced Costs in Both Direct Labor and Outage—installation time is less because small size and weight of castings allows them to be handled easily, without cranes and with less fatigue for workers.
5. Reduces Costs in Storage Space—because small castings stack easily, little storage space is required. One design of casting interchangeable for all size mills also simplifies records.
6. Reduced Costs in Liner Inventory—standardization is possible because one design fits all dia-

meters of mills. Standardization means quicker unloading and storage.

7. Reduced Costs on Breakage Claims and Delays for Replacements—small castings are rugged and almost impossible to break by handling. Large castings of hard, brittle irons sometimes break in shipment.
8. Reduced Costs in Determining Most Efficient Wear Patterns—you can get wear profiles consisting of all lifter ribs or all flats from the same castings, as well as a combination of both including straight or spiralled lifter pattern.

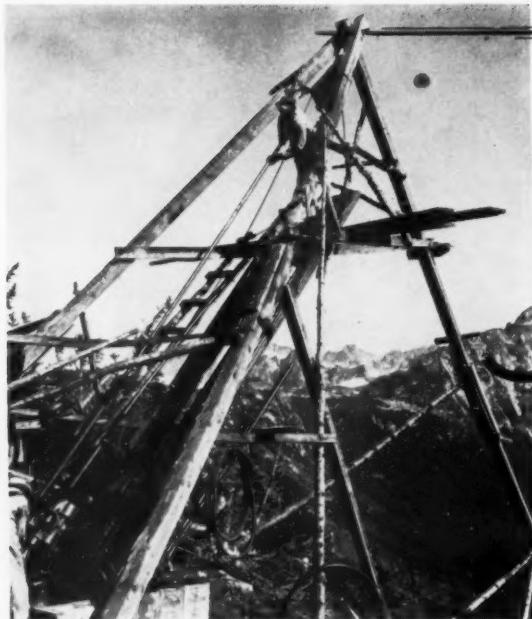
Liners are supplied in two nominal thicknesses, 1½" and 3" with 1½" high lifters. Castings are 6" wide x 12" long. Positive seating of small castings on mill shell means less breakage of castings under operating conditions. For additional information on B&W Universal Tube Mill Liner Plates write The Babcock & Wilcox Company, Process Equipment, Barberston, Ohio.

S-471

**BABCOCK  
& WILCOX**



BOILER  
DIVISION



## CORES via COPTER

Boyles modern exploratory drilling eliminates time and cost of packing-in to inaccessible areas.

Boyles Bros. Drilling Co. has adapted tools and machines to a helicopter operation that gets drilling jobs set up in almost inaccessible areas in a fraction of the time required by conventional land operations. Illustrated is a drilling job, in a primitive area of the Pacific Northwest, that would have required three weeks to pack-in the necessary equipment. The crew and all the supplies, except timbers secured at the site, were transported to the job in record time by helicopter.

Since 1895 Boyles Bros. Drilling Co. has applied its engineering skill and fine equipment to the task of completing jobs as per agreement.

Write or call your nearest Boyles Bros. office for complete details on:  
**EXPLORATION and DEVELOPMENT  
CORE DRILLING, SURFACE and  
UNDERGROUND  
ROCK BREAKING — GROUTING  
SHAFT SINKING — MINING  
QUARRYING and TUNNEL DRIVING**



Drilling horizontal hole underground.



Shaft sinking in uranium district.

**Boyles Bros.  
DRILLING COMPANY**

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FAirview 9-0732

Leadville, Colorado

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WEst 4-0673

Phoenix, Arizona

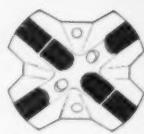
CRestwood 4-5331

Alaska

Contact Salt Lake City Office



Available in sizes up to 5". Note how location of carbide inserts in bit body has eliminated the need for a troublesome center spacer.



Kennametal PX  
Rock Bit

## HARD DRILLING? The easy way saves you money

### KENNAMETAL\* PX Rock Bits take you farther... faster

Kennametal's "X" design, with carbide inserts of alternately long and short lengths, eliminates rifling, provides greater clearance for large chips, permits two off-center, non-clog water ports.

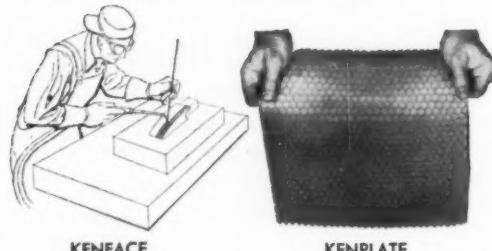
#### TYPICAL PERFORMANCES

PX-600-3½ and PC-600-3 drilled 150 ft. per regrind (8-10 regrinds per bit) in abrasive Pocono sandstone at speeds of 12" to 14" per minute. PXK-3½ drilled more than 1,000 ft. per bit of hard dia-base rock.

On-the-job records such as this require carbide of the highest quality . . . such as the grades developed at Kennametal's own refinery plants especially for mining, quarrying and construction.

Switch to the easy way. Let your Kennametal Representative help you select and actually test the Kennametal Bit style and carbide grade designed to best match your operating conditions. You'll find his name listed in the Classified Section of your Telephone Directory under "Mining." Or, write KENNAMETAL INC., Mining Tool Division, Bedford, Pennsylvania.

\*Trademark

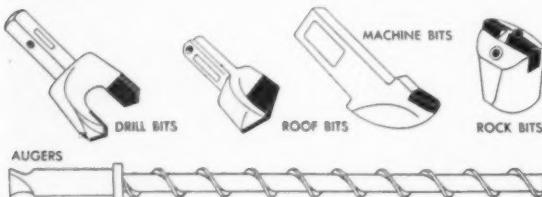


KENFACE

KENPLATE

Kennametal now offers hard-facing materials based on the same highest quality carbide used in Kennametal Mining Tools. **KENFACE**—Cemented carbide in tubes for oxy-acetylene application. More resistant to abrasive wear than any other tube or rod hard-facing.

**KENPLATE**—Solid hexagonal pieces of cemented carbide provide the ultimate in abrasion resistance. Supplied on flexible backing sheets that are easily cut to fit your work piece.



INDUSTRY AND  
**KENNAMETAL**  
...Partners in Progress



Many Mack users say that two Macks, correctly used, can do as much work as three ordinary trucks of equal capacity. You can have first-hand proof by asking your Mack distributor for the names of companies similar to yours who are reducing costs and increasing profits with Macks.

## How Macks can reduce your operating costs

**Remarkable agility.** With their rapid response and maneuverability, Macks spot under shovels almost instantly. Once loaded, they move away with smooth acceleration, even up the steepest grades.

**Quickly filled.** Macks can keep pace with the larger, faster shovels. They have the strong axles and flexible suspensions that stand up under the most crushing impacts.

**More trips per day . . .** because of their superior steering apparatus and great resistance to road shock. The famous Mack Balanced Bogie (tandem rear axle) gives a Mack steady pulling power through extreme conditions of mud, gravel and snow.

**Long-lived dependability.** Superior engineering, precision construction and the use of the finest ma-

terials throughout mean that Macks operate the longest and have the greatest freedom from upkeep problems of any truck made.

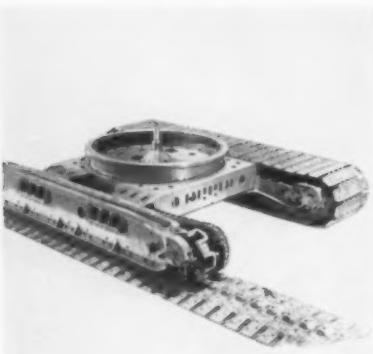
Mack Trucks, Inc., Plainfield, New Jersey. In Canada, Mack Trucks of Canada, Ltd.



FIRST NAME FOR TRUCKS

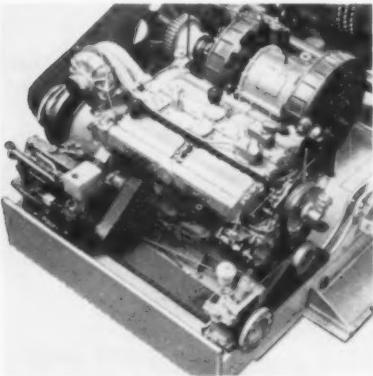
YEAR AFTER YEAR IN THE U. S. A. . . . MACK DIESEL TRUCKS OUTSELL ALL OTHERS

5709-E



#### SOLID STABILITY

Look at this massive carbodies and these long, wide crawlers! A solid base and a low ground bearing pressure of only 9.6 lbs. per sq. inch let you work right at the edge of a bank.



#### UNIFIED POWER PACKAGE

The 4500 is diesel engine powered with the capacity to tackle any job. There are no fussy electric motors . . . no dead-weight . . . no delicate circuits.

## a quick guide to increased mining output with the **Manitowoc 4500**



#### GREATER MOBILITY

Your operator travels steep grades without "babying" his machine . . . there's no rocking when moving. Lets you mine anywhere! And fast between job moves can be made by rail or highway trailer.



#### DIRECT POWER FLOW

No one but Manitowoc gives you a slide pinion design that directs power straight to the "business end". Only gears that are working turn and there are only 15 gears in the entire unit!



#### HI-LIFT BOOM

A 60' Hi-Lift shovel boom and a 45' stick are available to give extra reach and height. Standard 120' dragline boom handles 6-yd. bucket . . . special 140' boom and 4-yd. bucket extends digging range.



#### **MANITOWOC 4500**

5½-Yd. Shovel - 6-Yd. Dragline

MANITOWOC ENGINEERING CORP.  
MANITOWOC, WISCONSIN

**Manitowoc**

**GENERAL CABLE**

# **SUPER SERVICE**

## **PORTABLE POWER CABLE**



### **KEEPS THIS 2900-TON SHOVEL ON THE JOB**

Simco-Peabody Coal Company's mammoth Marion Type 5760 shovel, shown in operation at Coshocton, Ohio, proves once again that General Cable's Super Service Portable Power and Mining Cable can really take it under severe operating conditions. All Super Service cables have an extra-heavy-duty, mold-vulcanized Supertuf neoprene sheath that offers unequalled resistance to mechanical abuse, weathering, flame, oils, acids, and alkalis.

Cable that can stand up to this sort of treatment is a necessity wherever service interruptions can be costly. There's a complete line of General Cable portable power cables from 600V to 15KV, all constructed to keep your equipment on the job when the going is tough. Contact the General Cable Specialist at your nearest General Cable Sales Office and Distributing Center for complete information.

**GENERAL CABLE CORPORATION, 420 Lexington Ave., New York 17**  
*Offices and Distributing Centers Coast-to-Coast*



*for quality and service... specify* **GENERAL CABLE**



## **Ready to go on flow...with Thermocoal Belting**

Tough . . . fire-resistant . . . long-wearing, Thermocoal conveyor belting is used by profit-minded mine operators everywhere.

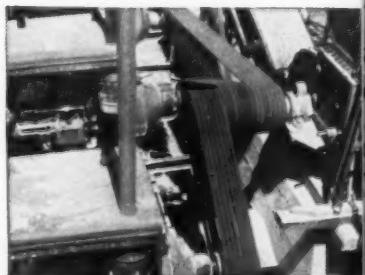
Here's belting that bears acceptance designation # 28-13 of the U. S. Bureau of Mines . . . meets or exceeds all after-flame and after-glow tests. It's rugged belting, with high resistance to flexing and impact, edge wear, abrasion and mildew.

Specify construction of cotton, cotton-nylon or rayon duck. All are impregnated with specially compounded Thermoid rubber stocks for long, economical service.

Order Thermocoal Belting through your Thermoid distributor, or write direct for detailed information and data sheets.

*Bears U.S.B.M.  
acceptance designation # 28-13.*

**Cut costs with  
Thermoid Multi V-Belts . . .**



**... and Thermoid Hose**



Thermoid Company  
Trenton, New Jersey  
Nephi, Utah

## ENGINEER'S FIELD REPORT

PRODUCT **CHEVRON VISTAC OIL**  
NEVADA-MASSACHUSETTS  
COMPANY  
FIRM Tungsten, Nevada

# Special Oil holds wear to minimum for 15 yrs.



**Nevada-Massachusetts Co.**, operators of one of the world's largest tungsten mines, has relied on Chevron Vistac Oil for 15 years, to keep their rock drills and other air tools operating at peak efficiency. "We use Vistac because it stays on the tools whether they're wet or dry. Doesn't create drag, either...we get full power with minimum tool wear," says general manager Eldridge Nash. Oil's tough, protective film resists high operating temperatures, helps

this firm's rock drills (above) bore fifteen 2½-inch blasting holes averaging twelve feet in depth, in just eight hours. Nevada-Mass. does extensive underground mining at this site as well as surface operations.

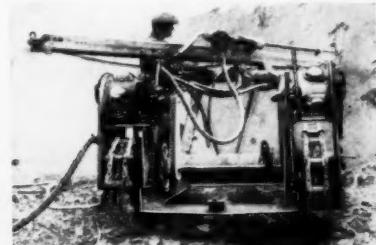
TRADEMARKS "CHEVRON," "VISTAC" AND CHEVRON DESIGN REG. U.S. PAT. OFF.

**STANDARD OIL COMPANY OF CALIFORNIA,**  
225 Bush Street • San Francisco 20, California

**THE CALIFORNIA COMPANY,**  
P. O. Box 780 • Denver 1, Colorado

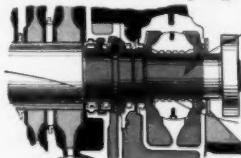
**STANDARD OIL COMPANY OF TEXAS**  
P. O. Box 862 • El Paso, Texas

**Despite heavy abrasive dust from drilling in Hornfels and Scheelite, (above), Chevron Vistac Oil keeps rock drills working smoothly. Lubricant is used in 60 rock drills, 3 wagon drills, plus 25 tuggers (air motors) on hoist equipment, loaders, slusher hoists and sump pumps.**



**Special wagon drill, built at mine, uses Ingersoll Rand DA 35 rock drill to bore horizontal holes up to 18 ft. deep. EIMCO air motors lubricated with Chevron Vistac Oil power tracks for fast and easy maneuvering.**

**Why Chevron Vistac Oil cuts costs in air-tool equipment**



- Atomizes quickly and completely—carries evenly over all parts. Prevents excessive fogging and has no unpleasant odor.
- Additives help form tenacious, oily, pressure-resistant film in wet or dry conditions—cuts wear and power loss.
- Resists high temperatures and oxidation. Stays fluid at low temperatures.

**For More Information** on this or other petroleum products, or the name of your nearest distributor, write or call any company listed.





**Accident!** But Anaconda SH-D Shovel Cable kept on working in this open-pit mine. Good proof of Anaconda Cable's ability to take it.

# CAVE-IN! But this unposed photo shows Anaconda Shovel Cable still working!

Above you see part of an actual cave-in. The Man from Anaconda was Johnny-on-the-spot with a camera, and the picture shows part of what he saw. The complete cave-in was much more extensive.

We use this photo to show how well Anaconda Shovel Cable stands up under abuse. Jagged rocks, sheer drops over cliffs, water-filled ditches—the Anaconda cable is built to endure all these hazards.

We're miners ourselves. All our practical experience—plus knowledge of what makes the best insulation and protective coverings—has gone into this cable.

Anaconda Shovel Cable has a strong, extra-tough—yet highly flexible—neoprene jacket. It resists abrasion, mechanical abuse, flame and water. Its long-lasting Anaconda Butyl Insulation has high dielectric strength, and outstanding resistance to ozone, heat and moisture.

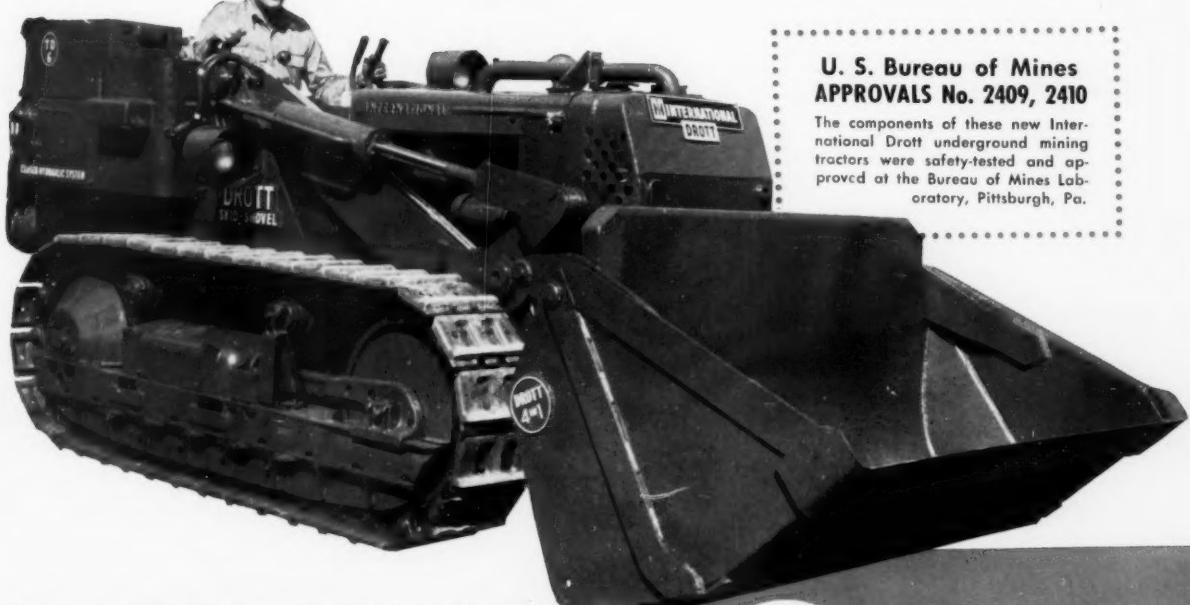
It all adds up to a cable that's ready when the going's rough. For full information about this rugged shovel cable, contact the Man from Anaconda or your Anaconda distributor. Or write directly to: Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

58317



SEE THE MAN FROM **ANACONDA®**  
FOR SHOVEL CABLE

# Get cost-tumbling 4-machine utility in NEW mining TD-6 or TD-9 4-in-1



**Yes, now you can have** the exclusive 4-In-1 with four-machine utility in two International Drott mining tractors: the new TD-6 with one cu yd capacity, and the 1½ cu yd TD-9.

Both versatile, big capacity rigs meet rigid U. S. Bureau of Mines safety standards for non-coal mining. Both feature the new short-coupled, stainless steel scrubber—that cools exhaust to a maximum of 160°F, while efficiently dissolving irritating aldehydes with water-bath turbulence.

The new design also provides blower fan action on the final exhaust which breaks up noxious gas concentrations to a ratio of 40 parts fresh air to one part exhaust.

In addition, low "trolley-clearing" profile, and "lean-over" features of these compact rigs provide unmatched, full-load "mine-tunnel" maneuverability.

**Prove the tremendous cost-cutting**, profit-producing advantages of getting big-capacity four-machine utility for one moderate investment—instantly, at the touch of a hydraulic machine-selector lever! See your International Drott Distributor for a demonstration of the new TD-6—or 1½ cu yd TD-9—mining tractor!

International Harvester Company, Chicago 1, Illinois  
Drott Manufacturing Corp., Milwaukee 15, Wisconsin



**INTERNATIONAL®  
DROTT**

## U. S. Bureau of Mines APPROVALS No. 2409, 2410

The components of these new International Drott underground mining tractors were safety-tested and approved at the Bureau of Mines Laboratory, Pittsburgh, Pa.

### *Ever wish you could pull a dozer "out of your hard-hat"...*



to quickly shave material aside or pile it? Well, it's just that simple with an International Drott 4-in-1!

### *Ever wish you could have a clamshell by "a twist of the wrist"...*



to have a bucket with "stand-and-fill" action to work under low ceilings and in close quarters? Well, it only takes a flip of the lever to start earning money with the 4-in-1's clamshell!

### *Ever wish you could take a "carry-type scraper" underground...*



one that can strip, grade, or spread with inch-close accuracy—and can "skin-off" layered materials like nothing else on tracks? Well, you can! Famous 4-in-1 gives you this action, too!

### *Ever dream you could command "rock-busting" Skid-Shovel action...*



from a mobile, sure-treading crawler loader—and get three other machine actions, to boot? Well, you can in a 4-in-1—for Skid-Shovel action, with exclusive pry-action break-out, is integral in 4-in-1 design!



Gardner-Denver DH-143



Gardner-Denver Rotary 600

## Pace Setters for Open Pit Production... Gardner-Denver Quality Drilling Equipment

### For Blast Hole Drilling . . .

SUPER 5½" DH143 CRAWLER DRILLS—self-propelled heavy-duty drill. Packs plenty of deep hole punch in all formations.

DELUXE "AIR TRAC"® CRAWLER DRILLS—all controls for drilling, drill positioning and crawler drive are centralized for ease of operation. Available with 4" or 4½" drills. Also "Air Trac" without remote controls.

NEW GARDNER-DENVER "MOLE-DRIL"®—for use with rotary rig. An in-the-hole drill in two models for drilling 4¾" and 6" hole in hardest rock.

WAGON DRILLS—light- and heavy-duty for every need. AUGER DRILLS—both wagon drills and "Air Tracs" can be equipped with rotary motor for auger drilling.

QUARRY DRILLING AND BROACHING DRILLS.

DEEP HOLE DRILLS, DRIFTERS AND SINKERS—a complete line.

AIR FEED LEG DRILLS—and air feed legs for sinker mounting.

DRILL FEEDS AND CONTROLS—to fit every drilling job.

### For Quality Drill Steel . . .

SECTIONAL DRILL RODS—highest quality—shot-peened and carburized to stand down-the-hole gaff longer.

RING SEAL SHANKS—replaces old-type water swivel without adding additional length to drill.

COUPLINGS—extra long, extra hard threads—made for longer drilling life.

### For Air Power . . .

GARDNER-DENVER ROTARY PORTABLE COMPRESSORS—five models that offer water-oil cooling for all-weather operation, "THRIFTMETER"® fuel control, easy-to-get-at parts for speeding maintenance, clutch that eliminates cold-weather dry compressor starting. Sizes from 125 cfm. to 900 cfm.

STATIONARY AND SKID-MOUNTED COMPRESSORS—eight compact WB compressor packages that deliver continuous trouble-free performance. Water-cooled. Combination radiator-intercooler saves cooling water. Sizes from 142 cfm. to 1150 cfm.

### For Building Your Own Jumbo . . .

JUMBO COMPONENTS—for tractor and truck mounting or building your own jumbo.

DRILL POSITIONERS—provide hydraulic swing and dump on end of booms for drill and feed positioning.

HYDRAULIC BOOMS—powered by creep-free hydraulic cylinders that operate at low pressures.

HYDRAULIC REMOTE CONTROLS—for remote-control operation of drills, feeds, drill positioners and booms from any centralized position.

### Plus . . .

Bit Grinders • Centrifugal Pumps • Air Hoists • Drill Steel Shapers and Sharpeners • Sump Pumps • Air Maintenance Tools • Oil Forges • Air Line Oilers • Air Motors • Breakers • Tampers

\*Trade-Mark



ENGINEERING FORESIGHT—PROVED ON THE JOB

IN GENERAL INDUSTRY, CONSTRUCTION, PETROLEUM AND MINING

# GARDNER - DENVER

Gardner-Denver Company, Quincy, Illinois

Export Division, 233 Broadway, New York 7, New York

In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curley Ave., Toronto 16, Ontario

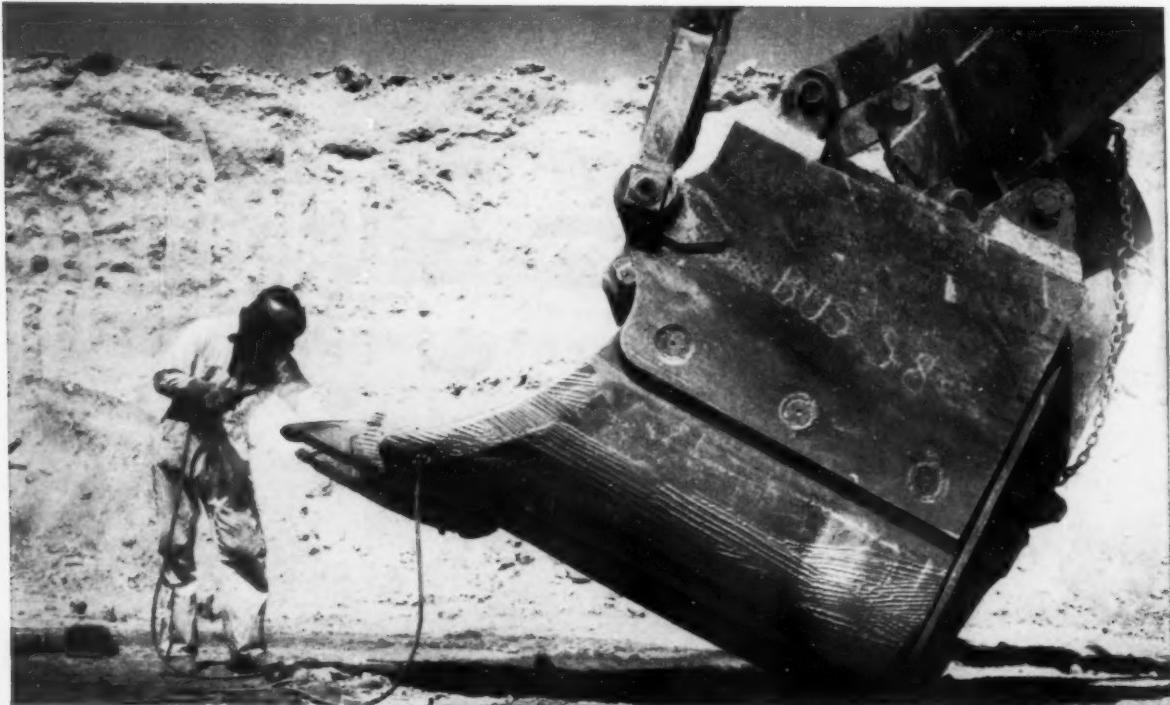


## BIGGEST DIGGER ON TWO CRAWLERS

The 10 yard dipper of this big digger is impressive, for the MARION 191-M is the world's largest loading shovel on two crawlers. Equally important on the iron range is the fast, small-machine cycle time that converts mountains into rail car loads in jig time.

MARION POWER SHOVEL COMPANY • MARION, OHIO  
A Division of Universal Marion Corporation

# How STOODY HARD-FACING keeps STRIP MINING EQUIPMENT on-the-GO!

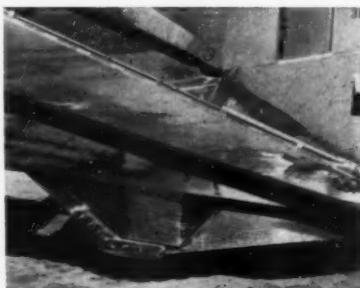


A few beads of Stoody Electric Tube Borium keep the points of these shovel teeth out to size, while unprotected teeth lose a full inch of length in the same time.

Heavy earth moving equipment used in open pit operations lasts far longer and requires fewer replacement parts when wearing surfaces are hard-faced with Stoody alloys. The illustrations show typical examples of both manual and semi-automatic applications. For top welding speed—2 to 4 times faster than manual welding—use Stoody semi-automatic tubular alloy wires...to speed maintenance during short down periods and between shifts, to save time and cut over-all costs.

Ask your Stoody dealer for a free copy of the Stoody Guidebook and the Semi-Automatic Wire folder; this literature covers hard-facing recommendations for all types of heavy equipment. Check the "Yellow Pages" of your phone book for local distributors—or write direct.

**Shovel teeth** are first hard-faced as shown with Stoody 100 by the semi-automatic welder. Points are touched up manually during lunch time and at end of shift with  $\frac{3}{16}$ " Stoody Coated Electric Tube Borium.



Cutters and sides of scrapers are subject to severe wear. Semi-automatic application of Stoody 100 provides protection.



Parallel beads of Stoody 100 are run along bed of dump trucks to reduce wear in these areas. Material packs between beads, further reducing wear.

**Ripper teeth** have wearing surfaces hard-faced semi-automatically with Stoody 100. 1 or 2 beads of Tube Borium hold points to size.



**STOODY COMPANY**

11932 East Slauson Avenue

Whittier, California

# Technological Progress in the Mineral Industry

**EXPLORATION** must be based on realistic long range planning says Tom Gillingham ..... Page 42

**HYDROMETALLURGY** for new metals and low grade ores is strong view of C. J. Lewis ..... Page 44

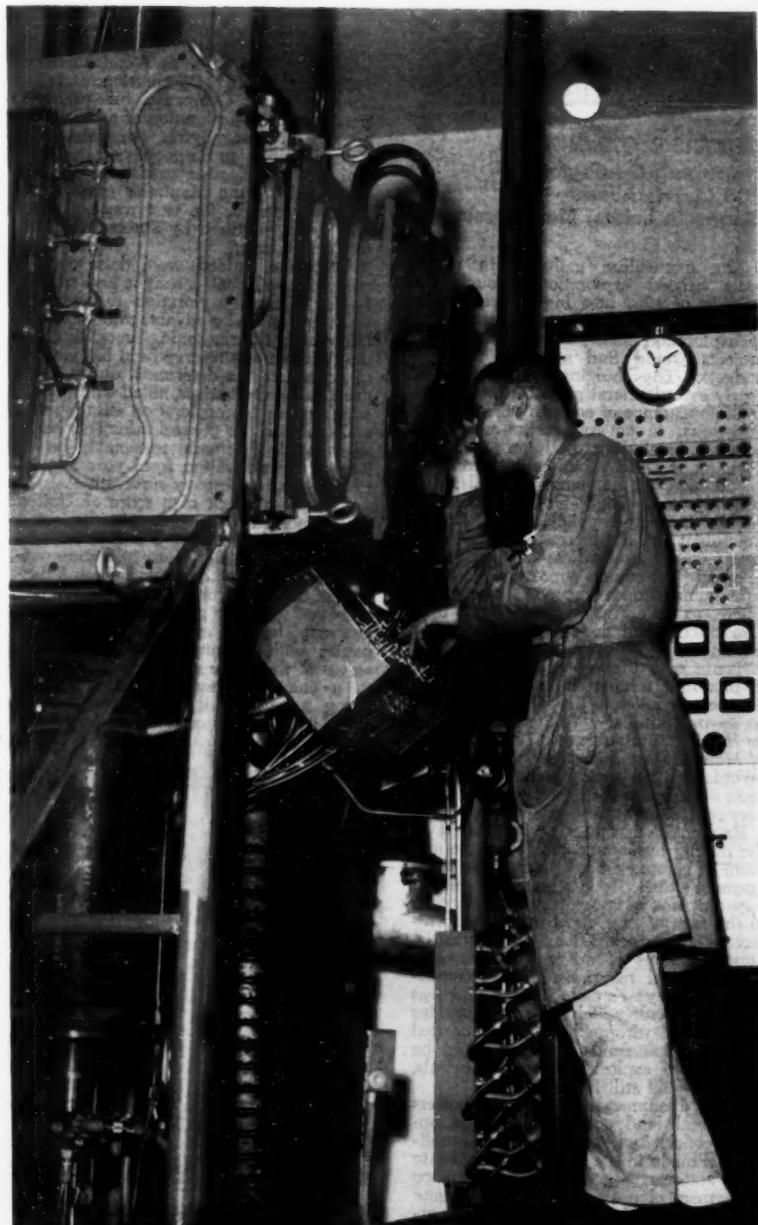
**URANIUM** metallurgical research has saved money by new processes says H. L. Hazen ..... Page 47

**ORE DRESSING** progress shown by many method improvements reports F. T. Davis ..... Page 49

**IRON ORE** beneficiation marks 50 years progress on Mesabi Range says S. E. Erickson ..... Page 51

**EUROPEAN** metallurgists develop new underwater screen, dry magnetic separation ..... Page 53

**MINING** looks for high speed high tonnage methods and equipment says R. M. Stewart ..... Page 55



# Long Range Exploration Plans Necessary To Maintain Recent Discovery Success



**THOMAS E. GILLINGHAM**  
Consulting Geologist  
284 Morris Avenue  
Mountain Lakes, New Jersey

The momentum gathered in recent years carried exploration through the summer of 1957 at a high level, but, as the autumn leaves fell, so did the hopes of exploration managers that their new projects would find approval in 1958 budgets. The bulging inventories of nearly every mineral product; the decline or disappearance of company income; the slow-down in government purchases of minerals, including uranium ore; the lowering of DMEA loan ceilings from 75 to 50 percent on most minerals; the arbitrary and frightening changes in mining laws and policy, as in British Columbia; and the increases in costs and taxes almost everywhere—all these developing in rapid succession—brought mining men once again to the point where, as an editor wrote in 1921, they "are talking and acting as if the world were about to return to the stone age and dispense with the use of metals, and as if, therefore, mining as an industry were destined to fall into irretrievable decay." As anyone familiar with the *Paley Report* or Harrison Brown's book *The Challenge of Man's Future* knows, such feelings are myopic, but they are based on the hard facts of our day-to-day economy and are very real to employer and employee alike.

Exploration has become a big part of the mining business, calling for more and more of company funds and of top management's time. Its inherent risks and its apparent lack of immediacy make its cost, in the face of glut, hard to justify to directors and stockholders. Consequently, most programs of mineral search came under critical reappraisal and retrenchment by the year's end. Management was forced to decide which projects or options should be dropped, which carried through; what funds, if any, should be allocated to exploration; what minerals, if any, should still be sought.

Acute dilemmas were faced in matters of mineral land acquisition, where options, concessions, and contractual obligations, made in the frenzied rush of late years and carrying onerous performance or payment clauses, were involved. Some optioned lands lost their immediate attractiveness and yet looked too good for

the long run to be surrendered to possible bidding from competitors. Prior contracts, often related to options, were largely responsible for carrying diamond drilling, for example, through the late months of 1957 at a high rate, comparable to the 1955 Canadian performance of 6,500,000 feet.

**OPTIONING AND CLAIM STAKING** dropped off substantially in North America, but there were staking rushes at Mattagami, Lake La Ronge, and elsewhere in Canada, and, apparently, an increase in exploration concessions, especially to groups of companies, in the remote lands of Africa, South America, the Caribbean, and Australia—parts of that great repository of mineral wealth known to geologists as Gondwanaland. Newton Mining Corporation and Rio Tinto Mining Company, for example, participated in exploration of a large concession in Tanganyika. An interesting type of concession for geophysical mineral search with selective staking rights was innovated by the Manitoba government in recognition of the vast waste of time and money required by unselective "protective" staking.

fortunate, indeed, were those companies with sufficient foresight and reserve funds to carry exploration through the doldrums and take advantage of property bargains in the slackening times. But, the desideratum of a reserve fund has yielded in general to tax deterrents and to more practicable alternatives, allied with profits, which cause the exploration effort to rise and fall with the general tide. This being so, what funds should reasonably be allocated to exploration from year to year to help assure company survival?

A random check of a score of United States and Canadian companies, large and small, reveals that, on the average, the amount spent in 1956 for exploration outside the home properties was about 8 percent of the figure for net profit. The range, however, was very great—from zero to 80 percent. The zero applied to a few companies with seemingly comfortable reserves at the home mine; the high figure to a company desperate to replace a dying mine. For the older, well-established companies, bent on long-range sur-

vival, the range was about 5 to 20 percent, depending, of course, on many factors. For International Nickel Company of Canada, Ltd., the average over the past decade was about 7 percent. In lieu of the ideal but often impracticable reserve fund, therefore, it would seem wise to maintain exploration at least on some percentage of net basis. Skeleton staffs could then be augmented in good times by temporary employees and contractors. This is usually what happens, but it is seldom a defined policy.

In January 1957, most commercial minerals were still attractive goals for search; by December, hardly any seemed worth the looking. During the year, lithium, beryllium, and boron flared with talk of astronautical fuels; silver, and a host of non-metalliferous minerals came under hopeful survey, and even lowly gold stirred from its long slumber. The ores of aluminum, iron, chrome, manganese, and molybdenum seemed to retain some attractiveness, judging from reported activity; a few companies, blessed with funds, continued diligently their searches for the old standbys—copper, lead, and zinc.

**EXPLORATION IN 1957** was reasonably successful; despite curtailments, probably more discovered ore was brought into world reserves than was mined. Some may presently feel that too much ore has been found, but today's troubles certainly stem less from overfinding than from the natural tendency, abetted by capricious government policies, to get every new deposit into production as soon as it is found.

In reviewing the accomplishments of exploration, it is well to distinguish between the genuinely new discoveries of long-sought types of ore and the reappraisals of long-known but heretofore worthless deposits, such as the taconites, that have been brought into the category of ore by techno-economic breakthroughs. The rather sudden acceptance of 30 percent iron ores for beneficiation has eased greatly the exploration challenge for iron, just as selective flotation did for lead and zinc. With this in mind, the new "discoveries" of iron ore reported from almost every quarter must be judged. The vast tonnages of such ore reported in Quebec-Labrador, Ontario, the sub-Arctic, Australia, and elsewhere are astonishing and gratifying, but many of these deposits have been known, at least in a general way, for years. A notable exception, announced last year, was the geophysical discovery of deep magnetic iron ore in Missouri by St. Joseph Lead Company.

On the other hand, it was the remarkable success of exploration, an "ore finding breakthrough" if you like, that brought uranium ore into superabundance following the establishment of incentive prices based on suspected scarcity. New processes and new uses are now needed to absorb the newer metals, such as uranium, columbium, lithium, titanium, and zirconium, and once again expand the exploration challenge.

In 1957, much ore was found by routine mine geology in existing mining camps, but most of it was not formally reported. However, new silver-lead veins were announced from the Bunker Hill and the Dayrock mines in the Coeur d'Alenes of Idaho and the Keno Hill camp in the Yukon. New uranium ore discoveries in younger camps brought the total reserves of Ambrosia Lake to near 40,000,000 tons, the known reserves of Wyoming to about 9,000,000 tons, and total domestic uranium ore reserves to



DISCOVERY SUCCESS for uranium continued high in 1957 with more ore found than mined.

over 75,000,000 tons. Copper ore bodies were found in the old Cabildo camp in the province of Aconagua, Chile; ASARCO reportedly found over 65,000,000 tons of better than 1.0 percent copper ore at East Pima, Arizona, and another 10,000,000 tons of 1.5 percent copper ore in the East Jersey zone at Highland Valley, British Columbia, bringing the known reserves there to near 100,000,000 tons.

Exploration in the deep levels at Kirkland Lake, Canada disclosed high-grade gold veins at a vertical depth of 8,100 feet in the Wright-Hargreaves Mines Ltd.'s mine, now the deepest in the Americas. And, incidentally, on September 15, 1956, for the first time in mining history, a vertical depth of 10,000 feet was reached, at the Champion Reef mine in the Kolar goldfield, India. Rock temperatures on the bottom levels are about 150° F and working temperatures in places exceed 115° F.

Virgin deposits of copper ore were reportedly found at Suonenjoki, Finland; Legnica, Poland; Bahr el Ghazak, southern Sudan; and Chibougamau, Quebec, where Yorcan Exploration Ltd.'s. drilling through lake ice proved an ore body indicated by geophysics. American Metal Climax, Inc. has found over 100,000,000 tons of 1.0 percent copper ore, similar to the White Pine deposit, in Upper Michigan, and Craigmont Mines Ltd. announced a large copper-iron ore discovery in British Columbia. The possibility of a new major copper belt in South West Africa was reported, but confirmation or details are lacking.

Lead ore discoveries were made in the Boquira area, Brazil; in West Pakistan; and in Australia, 400 miles northwest of Mt. Isa, by the Mount Isa Mines Limited. Exploration for nickel was underway in South Australia, Canada, and elsewhere. In the desolate Cape Smith-Ungava belt of Quebec, drilling last summer failed to disclose another Sudbury; the nickeliferous pyrrhotite apparently occurs there in relatively small, high-grade lenses in a long, trough-like formation of sediments with basic intrusives.

**CANADA'S OUTSTANDING** find of the year was Mattagami Syndicate's ore body in northwestern Quebec. The deposit, which was found by drilling an aeroelectromagnetic anomaly, lies in greenstone beneath 50 feet of overburden and contains at least 10,000,000 tons of ore averaging 10 percent zinc, 0.75 percent copper, 0.01 ounce gold, and 1.0 ounce silver per ton.

In the less glamorous field of the so-called industrial minerals, special mention can be made of exploration for asbestos, borates, diamonds, phosphate, and titanium minerals, although activity was not limited to the search for these. The success of the Cassiar Asbestos Corporation Ltd. in the mountains of British Columbia has spurred the search for asbestos elsewhere in the Canadian northwest, and several new deposits have been found, the largest lying near Dawson in the Yukon. In the Baie Verte area of Newfoundland, Advocate Mines Ltd. has opened a deposit said to contain over \$200,000,000 worth of chrysotile asbestos. In San Bernardino County, California, United States Geological Survey's drilling, based on careful geologic mapping and gravity surveys, cut 76 feet of colemanite-bearing beds, averaging 14 percent acid soluble  $B_2O_3$ , at a depth of 1,100 feet. Kern County Land Company is following up this timely discovery. C. F. Davidson recently reviewed, in the *Mining Magazine*, Russian accounts of a



AEROELECTROMAGNETIC SURVEYS, particularly in Canada, became routine during the year. Sulphide conductors were found beneath as much as 300 feet of water or soil.

vast new alluvial diamond field associated with kimberlite pipes in the Viluy River basin of northern Siberia. This discovery has removed the principal deficiency in the mineral economics of the U.S.S.R.

Considerable drilling and land acquisition activity followed the entry of Bear Creek Mining Company into the coastal plain area of Beaufort County, North Carolina, where tremendous tonnages of phosphatic sands, known since 1952, lie in gently dipping beds of Miocene age, unfortunately beneath 100 feet or more of water-soaked sediments. In the coastal plain near Lakehurst, New Jersey, ASARCO has blocked out, by shallow drilling, a sufficient tonnage of titanium-bearing sand to justify a plant for the recovery of ilmenite and leucoxene, which constitute the bulk of the heavy mineral fraction. Other companies are interested in these deposits, which have been described by members of the New Jersey Geological Survey.

**ORE FINDING** has become more and more scientific through the use of geophysics and geochemistry and through additions to our knowledge of ore deposits and ore formation. While there were no very startling new methods reported in 1957, there were many improvements in technique and in the application, understanding, and acceptance of known methods and theories.

In the field of geophysics, the aero-magnetic (AM) survey became a recognized method for delineating rock structures over broad areas, and, through private contract and such arrangements as the Canadian Colombo Plan, was applied widely from Canada to Tasmania. The United States Geological Survey adapted the relatively cheap airborne scintillation survey to differentiate rocks of slightly different radioactivity between outcrops. The more expensive aeroelectromagnetic (AEM) approach, already credited with many discoveries, became routine for detecting sulfide conductors beneath as much as 300 feet of glacial, soil, or water cover, particularly as a follow-up of the AM method. Hans Lundberg described to AIME the use of the airborne gravimeter in detecting chrome and other minerals. Further improvements in induced polarization and related electrical methods point to an eventual solution of the toughest of all exploration problems—the detection and discrimination of valuable disseminated sulfides beneath hundreds of feet of barren cover. New streamlined, lightweight equipment appeared, typified by the new 15-pound Varian Associate's transistorized magnetometer replacing a

250-pound older model, and by the new portable seismometer developed by the United States Geological Survey. The trend of geophysics is toward still more airborne instrumentation and the use of electronic gadgets and computers.

Photogeology has become an accepted method for reconnaissance and for certain detailed work, thanks to the excellent stereoscopic aerial photographs and topographic maps that are being made available by all progressive governments and by private contractors. T. W. Mitcham described in *Mining Congress Journal*, November, page 66, a technique for pinpointing exploration targets, which he calls "mining photogeology," and P. A. Laylander discussed in *Mining World*, April, page 56, the use of colored aerial photographs in ore search.

In Canada and the United States, geochemistry has been overshadowed by geophysics, but discernible lately is the gradual welding together of the rather prosaic testing of rocks, soils, water, and plants with a much broader concept of the occurrence and movement of elements, isotopes, and compounds in the earth's crust. This new geochemistry brings into focus and use a vast array of analytical and experimental data, which will yield sooner or later the answers to many questions of ore genesis and ore finding. The Russians have given far more attention to this subject than we have; at their Vernadsky Institute of Geochemistry alone, over 300 geochemists are at work, and many new discoveries, even in the frozen tundras of Siberia, have been credited to geochemistry. Excellent reviews of this subject in general and of radiogeology in Russia, by C. F. Davidson, appeared in the *Mining Magazine* in 1957.

Under the broader concept of geochemistry falls most of the research on ore deposits and ore genesis being performed with amazing success, but without coordination, at university and government laboratories. A very commendable plan to coordinate this work, proposed in 1956 by a committee of the National Science Foundation, failed to find, among the mining companies, the modest financial support required, but Dr. James Boyd, vice president of Kennecott Copper Corporation, chairman of the committee, reports that funds may be forthcoming from another source. In the face of such cogent arguments for research as were advanced by the Boyd Committee and by H. M. Bannerman in a paper in *Mining Engineering*, October, page 1,103, the reluctance of the mining industry to

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cooperate financially is incomprehensible. THE RESEARCH CONTRIBUTIONS of 1957 cannot be reviewed here with the justice due the many authors, whose papers appeared in the scientific press. They include (1) records of observation, (2) records of experimental work, (3) logical reasonings from assembled data, and (4) broad hypotheses. Some papers cover all four categories.

In 1957 there was an appalling dearth of good, sound descriptions of ore bodies—the fundamental records without which science cannot progress. A few excellent papers did appear, including United States Geologic Survey Professional Papers on the West Shasta, California copper-zinc district, the Garfield, Colorado, complex ores, and the Congonhas iron ore district of Brazil; a U.S.G.S. Bulletin on the mineral deposits of Central America; Pelletier's paper on San Manuel geology; Lacy's on Cuajone, Peru; Richards and Courtwright's on Toquepala, Peru (Mining Engineering); and Campbell's on the Verna mine at Beaverlodge (Bulletin, Canadian Institute Mining and Metallurgy).

In the category of experimental results, several very significant contributions were made. They included studies of isotopic ratios, from which the absolute ages of certain ores and associated rocks were determined and by which a start was made on differentiating sedimentary from hydrothermal ores; studies of the stability ranges of sulfide systems, especially of the sphalerite-pyrite-pyrrhotite mixtures, from which clues as to the temperature range of ore formation were derived; and studies of the stability relations of minerals under various anhydrous and hydrothermal conditions and under various

ranges of temperatures and pressures, from the results of which there is evolving a better understanding of the probable nature of the ore forming fluid.

Notable among the papers based on logical reasoning from existing experimental and observational data, were Barton's on the limitations on the composition of the ore forming fluid, Bichan's on critical factors in finding hypogene ore, Morey's on the solubility of solids in gases, McKinstry and Kennedy's on ore mineral sequences, all *Economic Geology* and Holland's *Geological Society of America* on the interpretation of thermochemical data. Krauskopf's excellent discussion of the heavy metal content of magmatic vapor, *Economic Geology*, belongs in this category, though it admittedly invokes a number of questionable assumptions.

To the final group of papers belong those of controversial nature, usually on the subject of ore genesis, to almost every word of which, a dissenting voice calls forth. Thus, C. J. Sullivan, *Economic Geology*, on the basis of certain assumptions, in part implied, extended his hypothesis that relative heats of formation of minerals and diffusion of metals in a presumably dry environment can account for paragenetic sequences, zoning, and other ore phenomena better than can the hydrothermal theory. Krauskopf, (op.cit.) by thermodynamic reasoning from other assumptions, concluded that both Sullivan's approach and the earlier volatile sulfide hypothesis of J. S. Brown are untenable; that, rather, vapor transport may be the answer. Reports of laboratory work by Howe and Burnham, *Geological Society of America*, supported the latter conclusion. C. L. Knight, *Economic Geology*, advanced a "source bed concept," which

holds that many sulfide ore bodies are derived from sulfides originally deposited syngenetically in a particular sedimentary horizon and later, by temperature rise, transferred more or less to new loci, commonly, but not always, within the original horizon. On the origin of specific deposits, diverse opinions likewise found outlets. Robertson and Steenland (AIME) proposed a placer origin for Blind River uranium ore, as did Bain (AIME) for Blind River, Witwatersrand, and the Shinarump uranium; but C. F. Davidson, *Economic Geology*, advanced strong arguments for the epigenetic origin of uranium in ancient conglomerates. Bain (op.cit.) and Boetzen (Geol. Foren. Forhandl.) came out for an epigenetic, if not hypogene, origin for the Rhodesian coppers; but Rand (AIME) subscribed to an essentially syngenetic origin for the White Pine copper ores, but he admitted some subsequent transfer. So goes the battle of the geneticists, providing zest to the science.

In conclusion, may we repeat that exploration has become a vital part of the mining business, along with development, extraction, and beneficiation. It is an operation, not merely a research; but, just as rock breaking in the mine and grinding in the mill are always subjects for study and improvement, so are the tools of ore finding constantly to be improved by experiment and theory. As Evan Just, in his recent paper "A Look at Exploration," *Mining Congress Journal*, so well points out, management must recognize exploration's inherent perplexities and geologists must see its cold economic facets. The past year brought exploration to trial, not of its own making but from which it will certainly emerge stronger than ever, to face the great challenges of the future.

## Look To Hydrometallurgy For Winning The New Metals and Treating Low Grade Ore



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The progress of chemical technology both in and into the mining industry during 1957 was reflected more by laboratory research and piloting activities than by new commercial operation.

There was continuing indication that chemical processing is the most promising route for winning the newer metals, whereas new or improved chemical technology must be developed to render tailings and low-grade ore deposits commercially attractive. Chemical industries continued to examine entree into the metals field as a natural expansion of their operations, while the mining industry continued some research on the application of chemical techniques.

From a mining industry viewpoint, 1957 may also be described as a "year of shadows"—for the technical literature is abundant with reference to laboratory and pilot plant developments, forecasting revolutionary procedures in the processing of ores and concentrates. From scanning such references, one gets the impression that the mining industry is but on the threshold of research.

To list the many chemical developments of present or potential interest to the mining industry is beyond the scope of this article; only the highlights can be touched upon. For more details, the reader is referred to authoritative indexes.

Elements particularly in the limelight during 1957 were lithium, titanium, zirconium, boron, columbian-tantalum, the rare earths, thorium, nickel-cobalt, aluminum, magnesium, and beryllium. Processes of particular significance in-

clude solvent extraction, chlorination, selective leaching, sulfate roasting, and high-temperature smelting.

LITHIUM: In the field of lithium, American Potash and Chemical Corporation formed a new subsidiary, San Antonio Chemicals. Liquors from APC's lithium hydroxide processing are further processed by SAC to produce a mixed salt composed of the carbonates of potassium, rubidium, cesium, sodium, and lithium. SAC is researching processes for isolating the compounds of rubidium and cesium. In another lithium development it is reported that Montgary Explorations, Ltd., Toronto, Canada, will use Scientific Designs' process which employs a chloride volatilization to directly produce lithium chloride and a cement byproduct.

TITANIUM: If the literature may be used as a guide, the most researched metal during 1957 was titanium. Products from Titanium Metals Corporation of America, Electro-Metallurgical Company, Cramet, Inc., DuPont Company, and Dow Chemical Company resulted in a record output of titanium sponge. Stauffer Chemical Company disclosed a reportedly new metallic titanium process believed to utilize catalytic disproportionation starting with titanium tetrachloride and proceeding through the subchlorides. Armour Research Foundation reported developmental work to make pure titanium tetrachloride from ilmenite and low-grade ores. This process is based on a classical quantitative method for the separation of titanium, and might eventually replace the chlori-

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nation process. The Institute of Technology, Helsinki, Finland, reported on the chemistry and thermodynamics of the chlorination of ilmenite. Significantly, it is concluded that, unless specific catalysts are found for increasing the rate of chlorination of  $TiO_2$ , preferentially (or reducing the rate of chlorination of  $FeO$  and  $Fe_2O_3$ ), it will be necessary to find a method of removing iron from the ore prior to chlorination.

Mallory-Sharon Titanium Corporation, Niles, Ohio, reported a new electrolytic process for the recovery of titanium scrap. In this process it is claimed that scrap quality appears unimportant, and that the end product is large crystals of pure titanium metal formed on a steel cathode in a heated electrolytic solution. A patent application (Australian 22815/56) by Commonwealth Scientific and Industrial Research Organization discloses that ilmenite can be converted to rutile. Starting with a low-grade titanium ore and special heating, rutile crystals are produced. The mass is then selectively leached with sulphuric acid to result in a skeletal arrangement of rutile crystals, thus producing a high-grade titanium concentrate.

**ZIRCONIUM:** Nuclear demands continued to dominate the zirconium sponge picture in 1957. However, producers began to probe the commercial market, particularly the chemical and petroleum industries, because of zirconium's outstanding corrosion resistance properties. The U.S. Bureau of Mines at Albany, Oregon, reported a new process for making reactor-grade hafnium and zirconium. The new process is essentially a modified Kroll reduction of the tetrachloride. The Bureau claims that the product made by this process is better than that made by present reduction and separation techniques. U. S. I. Chemicals division of National Distillers and Chemical Corporation began studies on a zirconium process developed in Australia by the Commonwealth Scientific and Industrial Research Organization. This

process involves selective reduction of zirconium tetrahalides to trihalides. U. S. I. hopes to use the process in the new 2,000,000-pound-per-year zirconium plant under construction at Ashtabula, Ohio. The U. S. I. also piloted a CSIRO process, using a methyl isobutyl ketone for the separation of zirconyl and hafnium chlorides.

**BORON:** The attention received by boron during 1957 is not surprising. Boron-containing fuel additives continue to gain in popularity; boron is used in the so-called "exotic fuels" for military aircraft; and boron-bearing plastics are being considered for lightweight shielding in airborne nuclear propulsion systems. However, in spite of the boom in boron mining and the exploration of new boron reserves, there was little change in the boron refining process.

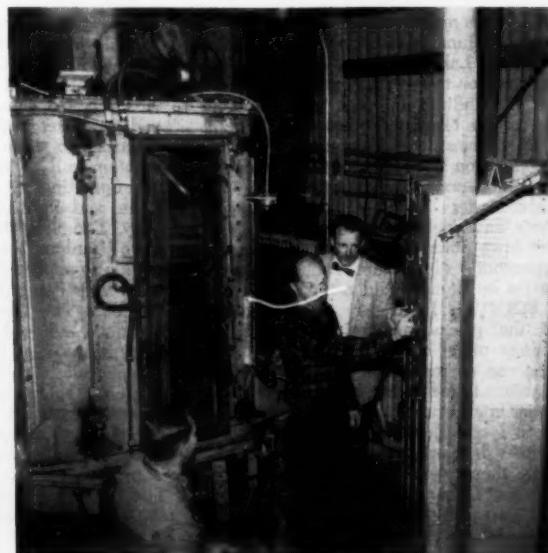
**COLUMBIUM AND TANTALUM** received much attention in 1957. The U. S. Bureau of Mines at Albany, Oregon, reported a liquid-liquid extraction process using hydrofluoric acid, sulphuric acid, and methyl isobutyl ketone to separate the two metals and simultaneously remove iron and other impurities found in the ore. Fansteel's liquid-liquid extraction process at its \$6,500,000 Muskogee, Oklahoma plant, continued to be tested. Columbium is of interest to nuclear researchers because it is suitable for cladding cores of fast reactors. It is effective in preventing the fission products from entering the system. It also surpasses other metals, such as zirconium, molybdenum, and vanadium, in resistance to heat and corrosion. It has been forecast that if columbium alloys can be sold at competitive prices, demand will reach 1,000,000 pounds per year. In a process developed jointly by Stauffer Chemical, Mallory-Sharon, and Temescal Metallurgical Laboratory, Richmond, California, electron bombardment melts ingots in high vacuum, thus removing volatile impurities. The first probable application of this process is reported to be the commercial production of high-

purity ductile columbium. Because columbium is so active chemically near its melting point, Westinghouse Electric Company's "cage zone melting" should aid in the design of columbium alloys. In this process the metal bar is moved up and down inside a high-frequency area which melts the bar from the inside out. Corners of the bar do not melt, but form a cage which traps the molten metal. As the bar rises through the high-frequency zone, a molten zone of columbium is caused to travel down the bar from top to bottom, thus producing the metal in its ultra-pure form. The importance of new techniques for the recovery of columbium is emphasized by the number of firms engaged in process development and the relative scarcity of actual producing processes.

**NICKEL AND COBALT:** There were significant developments pertaining to nickel and cobalt recovery during the past year. Freeport Sulphur Company, having successfully completed pilot planting, announced plans to build a plant at Moa Bay, Cuba, involving open-pit mining, acid leaching with sulphuric acid, and then shipment of the mixed salt to a Louisiana plant for separation and reduction of nickel and cobalt. Rated annual capacity of the plant will be 50,000,000 pounds of nickel and 4,400,000 pounds of cobalt. In addition, National Lead Company completed expansion of the government-owned nickel producing facility at Nicaro. This plant, after expansion, will have a capacity of 50,000,000 pounds of nickel yearly. The U. S. Bureau of Mines Northwest Electro Development Experiment Station at Albany, Oregon, announced a new leaching process that holds promise of improved recovery of nickel from Nicaro, Cuba, ores. The present process starts with the roasting of a nickeliferous iron ore to reduce nickel and cobalt to metallic form. These metals are then leached with ammoniacal solution and precipitated as carbonates. USBM has tackled the problem from two sides: separation



ZIRCONIUM REDUCTION plant of U. S. Bureau of Mines, Albany, Oregon, where a new process for making reactor grade metal was reported.



HIGH PURITY ductile columbium metal is made commercially in this high vacuum furnace of Temescal Metallurgical Laboratory.

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of cobalt from nickel solution by chemical or electrolytic means; and selective leaching of nickel from the carbonate followed by electrodeposition of the nickel. Best results to date, according to the Bureau, were obtained by leaching the carbonate with a nickel sulfate-boric acid electrolyte. However, more work is needed before the process can be scaled up.

In still another development, Metallurgical Resources, Inc. installed the revolutionary "smelter-less" Sill process on a 20-acre Hudson River waterfront site at Newburgh, New York, for treating "problem" ores with high contents of arsenic and sulphur from which cobalt and other strategic metals are obtained. In this process, leaching of arsenic and sulphur from ores is accomplished by autoclaves which replace conventional furnaces. With these impurities removed, cobalt and nickel, as well as silver, copper, and other metals, are successively precipitated along the processing circuit.

**RARE EARTHS AND THORIUM:** The attention received by the rare earths and thorium in 1957 appears to be considerably less than in 1956. Horizons, Inc., of Cleveland, Ohio reported research activities on the development of a liquid-liquid extraction process using an organo phosphate reagent and selective stripping for separation and purification of rare earth compounds. Davison Chemical Division of W. R. Grace Company indicated intentions to terminate extraction of thorium for the AEC at Curtis Bay, Maryland, while at the same time building a new plant at Erwin, Tennessee, to produce uranium, thorium, and rare earth metals for commercial sale. High-purity oxides of many of the rare earths for experimental purposes were in better supply in 1957.

Metal Hydrides of Beverly, Massachusetts, announced the development of a tetraiodide dissociation process for producing super-pure thorium metal. The MH process uses reactor-grade thorium as raw material and converts this into "crystal bar" metal by a process similar to the tetraiodide routes previously considered for commercial use in zirconium and titanium production. The Argonne National Laboratories, Lemont, Illinois, reported on the solvent extraction behavior of scandium, thorium, and zirconium in certain tetrabutyl phosphate mineral acid systems; the University at Liege, Belgium, on separation of the rare earths by ethylenediaminetetraacetic acid; the Laboratories Terres Rares, Bellevue, Paris, on the chemistry of scandium; and the Iowa State College, Ames, Iowa, on separations of yttrium and some rare earths by liquid-liquid extraction.

**SODIUM:** Interest in the technology of the production and application of sodium metal continued strong in 1957. The use of sodium in the reduction of titanium tetrachloride continued to be a major application, but some uncertainties as to future demand for sodium in this process developed during the year. However, there were developments to indicate that from a long-range point of view, new uses for sodium might be developed in processes for producing zirconium, columbium, tantalum, and beryllium.

**BERYLLIUM:** No major developments were reported with reference to new

technology for beryllium recovery or application. The government-owned plant operated by Brush Beryllium Corporation at Luckey, Ohio was shut down, reportedly due to lack of capacity. Almost simultaneously, Brush placed on stream a new \$4,500,000 beryllium plant at Elmore, Ohio. The Elmore plant is designed to turn out 240,000 pounds per year of beryllium hydroxide and 120,000 pounds per year of vacuum-cast beryllium metal. Much of this will go to the AEC, although other outlets will be beryllium alloys and special compounds.

**ALUMINUM:** Interest in aluminum chemistry appeared to be largely confined to the development of more efficient analytical procedures in connection with stepped-up exploration activities for bauxite. One interesting development was the process reported by the Illinois Institute of Technology, wherein aluminum reduction is the first step for producing titanium directly from the oxide. So far this process has been on a laboratory scale only. A possible new use for magnesium is also involved in that magnesium is added to the aluminum-titanium alloy to remove the excess aluminum.

**MANGANESE:** Desire for production of manganese materials from domestic ores increased sharply in 1957. The U. S. Manganese Corporation was formed to initiate activities at Orange, New Jersey, for pilot testing the Sheer-Korman high-intensity arc process for making metallurgical-grade manganese from Colorado rhodonite. It is hoped this process will allow recovery of manganese from the plentiful manganese silicate deposits. The U. S. Bureau of Mines reported on a so-called "percolation leaching" process for recovering manganese from ores which cannot be handled by conventional methods because of their clay-like characteristics. This method consists of forming crushed ore into piles, passing sulphur dioxide gas upward through them, and percolating water downward through the piles. In this process the sulphur dioxide gas dissolves the manganese to result in a manganese sulfate solution which can then be further treated to yield a product suitable for making ferro-manganese.

**SOLVENT EXTRACTION:** Process-wise, liquid-liquid extraction, more commonly called solvent extraction, continued to attract major attention. The new Texas Zinc Minerals Company's new uranium mill at Mexican Hat, Utah, began operating via the solvent extraction route, and Kermac Nuclear Fuels Company, Gunnison Mining Company, and Vitro Uranium Company, all indicated intention to apply solvent extraction in uranium mills being designed or under construction. The Dow Chemical Company described a liquid-liquid extraction process for preparing the green salt, uranium hexafluoride, directly from uranium mill sulphuric acid leach solutions. In this process an organo phosphate (cation exchange) is employed in one extraction cycle, and an amine salt (anion exchange) is used in the second extraction cycle. This double purification thus sets the stage for the precipitation of uranium hexafluoride. Dow states that the technology of this process, based on laboratory data, appears attractive, but piloting the process is necessary before an eco-

nomic appraisal of its merits can be made. However, of probably more significance was the application of solvent extraction to the recovery of vanadium and to the removal of impurities in processes for producing manganese and tungsten. Several new SX reagents appeared on the market. The Colorado School of Mines Research Foundation, Inc. was heavily engaged in solvent extraction research during 1957.

As may be gleaned from much of the foregoing, halide chemistry, particularly high temperature chlorination, received a rich measure of attention in 1957. It has been confidently predicted that fluorine, chlorine, and possibly iodine will be the magic bridges of the future to make it possible to move from ore concentrate directly to a high-purity metal without need for the present conventional intermediate steps.

**LEACHING:** Developments in specialized leaching in 1957 also forecast the tremendous potential of the application of chemistry to metals recovery processes. Pressure leaching and leaching with ammonia, sulphur dioxide, nitric acid, and sodium carbonate received much attention. An interesting discussion of these developing technologies, by L. W. Coffey, appears in the January 27, 1958 issue of *Chemical Engineering*. Sulfate roasting, particularly in fluidized beds, is a developing process of particular interest. In this application the desired sulfate is formed in a furnace and then selectively leached away from the undesirable material. For example, sulfides of iron, nickel, cobalt, cadmium, zinc, and copper form sulfates when roasted in air at controlled temperatures. At still higher temperatures, such sulfates decompose selectively to metal oxides. The development of the fluidized bed type of roaster now permits the close temperature control necessary during this kind of an operation. Sulfate roasting is also applicable to ores that can be mixed with cheap sulphur sources.

**SUMMARY:** The foregoing brief digest of 1957 chemical developments in or of possible interest to the mining industry reflects a healthy, aggressive situation. There may be a tendency at times to overemphasize chemical developments, particularly because so many of the chemical technologies are new to the mining industry; a closer examination often reveals that the chemistry itself has long been known, and even already in use by the chemical industry in a parallel application. No doubt the extensive application of chemical processing in the uranium industry has been largely responsible for the present high interest in applications of chemical technology to mining industry problems. However, chemical developments in the mining industry in the years ahead are apt to be less spectacular, if for no other reason than that they will have become an expected and accepted route in this industry. As others have so ably pointed out, the mining industry must turn more and more to chemical technologies and allocate more research and development dollars for this purpose; otherwise, the chemical industry itself will aggressively enter the mining field as the result of natural expansion pressures.

# New RIP Process, Solvent Extraction, Lower Concentrate Price Feature U<sub>3</sub>O<sub>8</sub>



By H. L. HAZEN  
H. L. Hazen, Inc.  
Mill Operators  
Farmers Union Building  
Denver 3, Colorado

During 1957 the uranium milling industry continued its swift pace in developing new processes, improving old ones, and testing new equipment.

**RESIN-IN-PULP:** More than half of the uranium concentrate produced in the United States during 1957 was again recovered by the acid-leach resin-in-pulp method. Two new mills using this process went on stream during the year; the Western Nuclear Company's plant in Wyoming, and the mill at Maybell, Colorado, operated by the Union Carbide Nuclear Company. The Western Nuclear mill uses the same resin-in-pulp technique used in five mills during 1956. The Union Carbide Nuclear Company's mill uses a different technique for its RIP process.

The RIP process recovers dissolved uranium from acid slime pulp by adsorption on anion exchange resin beads. In the first six RIP mills, which includes Western Nuclear, the resin beads are contained in acid-proof screen baskets that oscillate up and down in a trough through which acid-leached slime pulp flows. The resin beads are retained in the baskets by the screen but still have sufficient contact with the pulp to adsorb the dissolved uranium. The anion exchange resin beads never leave the basket during normal operation. Results similar to a counter-current flow of the beads and the slime pulp are obtained by controlled switching of the flow of pulp through the troughs in which the baskets oscillate. When a laboratory first conceived the idea of adsorbing uranium on anion exchange beads from a slime pulp, it was hoped that the resin beads could be handled in agitators by the same technique the Golden Cycle Corporation's Carlton mill at Cripple Creek, Colorado, uses for recovery of gold from cyanide pulps with activated charcoal. Laboratory tests soon showed that commercial resin beads were degraded by any normal agitation in a pulp, and the loss of fine resin would cost too much. The oscillating screen baskets solved this problem.

During 1957 Infilco, Inc., Tucson, Arizona, designed equipment to use anion exchange resin beads in a slime pulp

in a true continuous counter current flow. They claimed that the gentle agitation in their machine would not degrade the anion exchange resins currently on the market. Union Carbide Nuclear Company tested the equipment with Permutit resin and decided to use a modified Infilco machine in its new RIP plant at Maybell, Colorado. The modified design of the Infilco equipment uses Sweco vibrating screens to separate resin beads from an acidified slime pulp containing 20 percent solids. This pulp contains three times the quantity of slime that can be tolerated in any of the RIP plants using baskets. The metallurgical results at the Maybell RIP plant are reported as very satisfactory and erosion of the resin beads within tolerable limits. If time confirms the results reported above, then the metallurgical industry could well have use for RIP in the treatment of other metals as well as for recovery of uranium.

One of the major troubles that the basket RIP plants have had is in breakage of screen cloth used in the baskets. In the mill it built for Western Nuclear, Western Knapp Engineering Company designed and installed baskets in which the screen cloth is held under tension at all times. Western Nuclear reports that they have not had one screen break because of flexing since start of operations.

At Bluewater, New Mexico, the Anaconda Company has changed the reagent used for elution of resin in its RIP plant. Anaconda is now using an acidified sodium chloride solution instead of the ammonium sulfate eluant formerly used.

At Edgemont, South Dakota, Mines Development, Inc. decided to add the eluent system to the RIP plant so that all tailing water could be returned to process.

In the eluent process that Mines Development is now designing for its Edge-

mont mill, the Permutit anion exchange resin beads will be eluted with 10 percent sulphuric acid solution. Uranium will be recovered from this strong acid solution by solvent extraction. The mill will use di-2-ethyl hexyl phosphoric acid and tri-butyl phosphate dissolved in kerosene as the extracting organic. After removal of uranium, the strong barren acid will be used partly for acidifying the pulp in the leach circuit and partly re-cycled for eluting uranium from the RIP circuit. All mill tailing water overflow from the slime pond will be recycled to the mill and used as a wash in the sand washing circuit.

Every uranium RIP plant continued to enjoy the great advantage that is inherent in the process, namely, an extremely low soluble loss. This low soluble loss averages between 0.1 and 0.4 percent of the uranium dissolved from the ore.

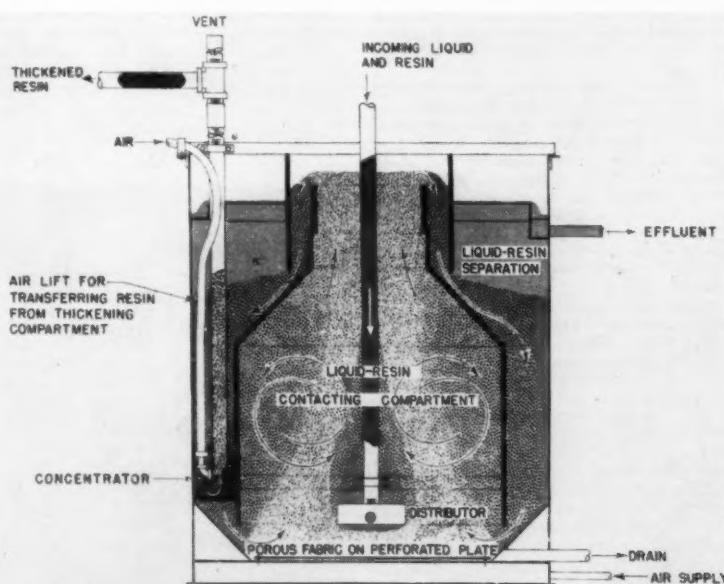
## COLUMN ANION EXCHANGE:

Column anion exchange gained one customer and lost one customer during 1957.

The uranium mill at Shiprock, New Mexico, owned and operated by Kerr McGee Oil Industries, Inc., shut down its anion exchange columns and replaced them with a solvent extraction circuit. The reason—less cost and more profit.

The Dawn Mining Company, a subsidiary of Newmont Mining Corporation, went on stream at Ford, Washington, with column anion exchange to recover uranium. This mill uses a rather unique counter current acid leach with counter current decantation washing. The details of this operation are reported by Don Hargrove, assistant manager, in MINING WORLD of February 1958.

Column anion exchange has the advantage of a low cost for eluting and recovery of uranium from the resin. Column ion exchange equipment can be built of relatively inexpensive material that will stand an acidified sodium chloride solution. Any RIP resin can be stripped with the same chemicals, but the corrosive action of an acidified sodium chloride makes it necessary to build the RIP screens out of Hastaloy and other



TRUE CONTINUOUS counter current flow of uranium rich pulp and anion exchange resin beads was tested for first time in 1957 at a commercial uranium mill.

## Uranium Metallurgy

costly alloys. Because of this, only Anaconda uses acidified sodium chloride for elution of resin in an RIP circuit.

**UPGRADING.** Vanadium Corporation of America continued to profitably operate its upgrader at Monument No. 2 mine in Arizona. The waste and overburden at this mine is ground wet and the slime separated from the sand in classifiers. The uranium concentrates into the slime which is filtered and dried in rotary kilns and then shipped to Durango, Colorado for uranium recovery. This upgrading produces a product containing about 2.0 percent  $\text{V}_2\text{O}_5$  and 0.25 percent  $\text{U}_3\text{O}_8$ .

During 1957 another "upgrader" operated profitably. This plant is owned and operated by COG Minerals Corporation and is located in Frye Canyon, Utah, and recovers uranium, copper, and certain sulfide minerals by gravity concentration. The company found in laboratory tests that ore from this particular area could be concentrated by carefully controlled wet concentration methods. The concentrator uses proven equipment such as jigs, tables, and Humphreys spirals. The mill tailing runs about 0.02 percent  $\text{U}_3\text{O}_8$  regardless of the grade of ore concentrated, and the concentrates are held down, when possible, to 5 to 10 percent  $\text{U}_3\text{O}_8$  containing about 20 percent copper. These concentrates are shipped to the new solvent extraction mill of Texas-Zinc Minerals Company at Mexican Hat, Utah.

The chemical upgraders being built by Union Carbide Nuclear at Slick Rock, Colorado and at Green River, Utah, were not completed in time to start operating in 1957.

**SOLVENT EXTRACTION:** Two new mills designed to use solvent extraction for recovery of uranium went into operation during 1957. A 750-ton-per-day-capacity plant was built by Texas-Zinc Minerals. This mill uses a Podbielnik centrifugal machine instead of customary mixer-settler units in its solvent extraction circuit. The 250-ton-per-day mill built by the Gunnison Mining Company at Gunnison, Colorado, started crushing ore the last of the year and uses mixer-settler units in its solvent extraction circuit.

In every uranium mill using solvent extraction, the extracting organic is dissolved in kerosene. This kerosene mixture then flows counter currently to the acid aqueous pregnant solution through equipment that alternately mixes and then separates the kerosene mixture and the aqueous solution.

Three of the five plants use di-2-ethyl hexyl phosphoric acid mixed in kerosene as the extracting organic. They also add tri-butyl phosphate to the kerosene to prevent phase separation in the settlers. The mills recover uranium from this di-2-ethyl hexyl phosphoric acid by stripping with 10 percent soda ash solution.

The Vitro plant in Salt Lake uses dodecyl phosphoric acid dissolved in kerosene to recover uranium from acid aqueous pregnant solution. The Dow Chemical Company, at Pittsburg, California, is responsible for most of the research work with dodecyl phosphoric acid. Uranium is recovered from the acid pregnant organic solution by counter current treatment with concentrated hydrochloric acid. Soda ash can not be used for this particular organic because the sodium form of dodecyl phosphate is soluble in soda ash solutions. The pregnant hydrochloric acid is very high grade and

its volume is small. Excess hydrochloric acid is distilled and recovered for reuse.

At Mexican Hat, Texas-Zinc Minerals uses a Rohm and Haas amine called 9D-178. This amine acts as a liquid anion exchange agent in contrast to organo-phosphoric acids which act as cation exchange agents. The amines have two advantages over organo-phosphoric acids. They do not extract ferric iron from aqueous acid pregnant solutions and uranium can be stripped from the organic with an acidified sodium chloride solution which is relatively cheap.

Every mill using solvent extraction is pleased with the metallurgical results. But the solvent extraction process has not yet advanced to the point where it can be used in slurries such as are treated in the RIP process. This means that the leached pulp must be washed substantially free of uranium before mill tailing is discarded to waste. Soluble loss of uranium in the washed tailing should be charged against solvent extraction when profits from that method are compared to profits from an RIP plant. Another important cost in the solvent extraction treatment is the loss of organic in the raffinate. This loss amounts to approximately one-half gallon for each 1,000 gallons of aqueous pregnant solution treated. Several ideas have been advanced to cut the cost of this loss, but none of these ideas have yet been put into practice.

**NEW MILLS BEING DESIGNED:** At the present time four mills are being designed for the Ambrosia Lake area in New Mexico, one mill is being designed for Riverton, Wyoming and one for Lakeview, Oregon.

The mill being designed by the Lakeview Mining Company for Lakeview, Oregon will use a hot acid leach to dissolve uranium and then recover the uranium from acid pregnant aqueous solution by solvent extraction.

The mill at Riverton, Wyoming, being designed for Fremont Minerals, Inc., will be a two-circuit plant. One circuit will dissolve uranium with sodium carbonate solutions and the other circuit will dissolve uranium in acid. Uranium dissolved in acid will be recovered from aqueous pregnant solution by solvent

extraction. The organic pregnant solution will be stripped with soda ash pregnant solution from the carbonate circuit and uranium finally recovered as yellow cake by precipitation of all soda ash pregnant solutions with caustic soda.

**FUTURE TRENDS:** The headlong advance of the uranium milling industry in the United States was suddenly stopped in October by an announcement from the director of Division of Raw Materials, AEC. Jesse C. Johnson said in substance that the government had contracted for all the uranium concentrate it needed. Since the only important purchaser of uranium concentrate in this country is the AEC, this meant that no new contracts for purchase of uranium concentrate would be granted and that no new mills would be built except under certain unusual conditions.

Shortly after Congress created the AEC, that commission formulated policies that resulted in the swift discovery of large bodies of uranium ore in western United States and in the development of new metallurgical processes to treat those ores.

A crash program in research was started, and altogether approximately \$30,000,000 has been spent to date by the government in research to develop methods of recovering more uranium more cheaply from its ores. This crash program paid off in a big way because it developed new and less costly metallurgy, such as resin-in-pulp, solvent extraction, and related techniques. These new methods are paying immediate dividends to the government, and they will be of great value in the treatment of ores containing metals other than uranium.

The engineers working for the AEC have taken advantage of everything the laboratories discovered. In tough but fair contract negotiations they have forced down the prices paid by the AEC for uranium concentrate because of improved mill designs that were developed, because of larger capacity mills, and they demanded and got reduced  $\text{U}_3\text{O}_8$  prices because of new processes developed in laboratories working under AEC contracts. Director Johnson's release of October 28, 1957 reported the following decrease in prices paid for  $\text{U}_3\text{O}_8$ .

Year	Average Price Paid by AEC Per Pound of $\text{U}_3\text{O}_8$
1956	11.60
1957	10.50
1958	9.60
1959 (Estimate)	9.30

It is publicly reported that United States production bought by the AEC will probably level off at about 15,000 tons  $\text{U}_3\text{O}_8$  per year. So the savings to the United States Treasury will total \$2.30 per pound for each of the 30,000,000 pounds of  $\text{U}_3\text{O}_8$ , and this amounts to a saving to the taxpayer of \$69,000,000 per year.

Now that contract negotiations for new mills are about ended, the AEC is cancelling most of the contracts it has with laboratories for research on recovery of uranium from its ores. The larger uranium milling companies are already operating research laboratories of their own. The smaller uranium companies have no research laboratories capable of doing basic research work and these smaller companies hope that the AEC will find it possible to continue some fundamental research work.



TENSIONED SCREEN baskets were introduced in RIP circuits for the first time in 1957.

# Ore Dressing in 1957 Featured Flotation, Grinding, Automation, and Mill Controls



By F. T. DAVIS  
Manager, Ore Dressing Division  
**Colorado School of Mines Research Foundation, Inc.**  
Golden, Colorado

The outstanding developments during 1957 were increased application of the DSM screen, study of high-speed grinding mills, and increased use of electrostatic separation. An increasing application of automation was observed in plants constructed during the year.

**CRUSHING AND GRINDING:** There was continued interest in hammer mill crushing during the year although the problem of excessive wear with the harder ores has still to be resolved.

An interesting forum was held in Ottawa, Canada, D. A. Livingston, Chief Metallurgist, Golden Manitou Mines, Ltd., led the discussion concerning protective devices for jaw crushers. This meeting included both operators and manufacturers and concerned devices presently used and devices that are planned for the future.

H. J. Chalmers reported on the grinding practice of the HB concentrator in British Columbia of Consolidated Mining and Smelting Company of Company Ltd.

This plant uses rod mill-ball mill grinding. Some classifier overflow is returned to the rod mill feed to correct for feeding difficulties. A comparative test of 2-inch balls versus 1% balls resulted in the smaller ball producing an increased grinding rate and with significantly less ball consumption.

The current methods for designing ball rationing charges were reviewed by Walter L. Crow, Engineer, Colorado Fuel and Iron Corporation. He pointed out that an intelligent ball rationing program requires considerable time and expenditure and that where time is not constant, ball rationing is probably not justified.

Potash Company of America is presently using ceramic balls in the grinding of potash following preliminary crushing at Carlsbad, New Mexico.

L. E. Djingheuzian, senior engineer, Division of Mineral Dressing and Process Metallurgy, Mines Branch, Ottawa, Canada tabulated and reported work indices on a number of operating mills. This tabulation related work index to liner shape and ball wear and, to some extent, to mill diameter, critical speed, and percent of ball loading.

H. A. Wright, Allis-Chalmers Manufacturing Company, has described the systems of electrical controls for both crushers and ball mills. This paper for the mill electrical designer describes the large variety of electrical starting and protective devices now available for this type of equipment.

At the International Mineral Dressing Congress in Stockholm, Sweden, in September, A. Z. Frangiskos, Athens, Greece, and H. G. Smith, University of Leeds, England, described the effect of surface active agents in grinding quartz and calcite. They postulate that this type reagent can be used in grinding to prevent the reclosing of micro cracks encountered in the initial step of an attrition process. Significant increases in surface areas produced in grinding were obtained with the use of NaOH and Na<sub>2</sub>CO<sub>3</sub> in grinding pulps.

R. T. Hukki, Finland Institute of Technology, described the preliminary results of his very fascinating study of grinding at supercritical speeds, i.e., up to 240 percent. Evidently a new grinding zone un-

common to conventional grinding is formed at these speeds between the grinding media and the shell of the ball mill. This work will continue and should be well worth following.

H. Tanner and T. Heikkinen of Outokumpu Oy, Finland, described the crushing and grinding practice at the Keretti plant in Finland. A conversion was made at this plant from steel balls to pebbles, and the speed of the mills was increased to 104 percent of critical. Lower pulp densities in the ball mill proved advantageous. This conversion resulted in over-all decreased grinding costs.

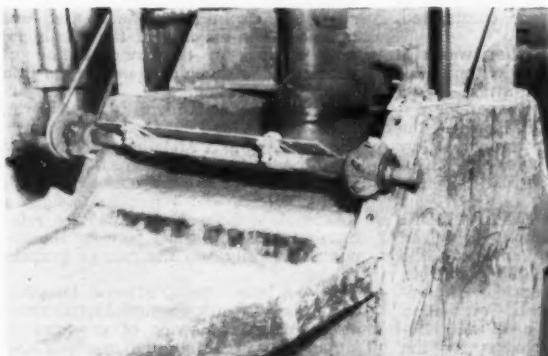
**SIZING AND CLASSIFICATION:** A noteworthy symposium on cyclones was held at the 1957 AIME meeting. During this symposium, E. C. Herkenhoff, chief metallurgist, Utah Construction Company, described methods of selecting the size and arrangement for cyclones for particular jobs. Fred Devaney, chief metallurgist, Pickands Mather & Co., discussed the use of cyclones in closed circuit grinding of taconite. Russ Salter, mill superintendent, Silver Bell, listed the many uses of cyclones in Arizona milling practice, including primary grinding, regrinding, production of smelter flux, degritting lime slurries, and as flotation feed conditioners.

It is becoming obvious from many reports that the cyclone frequently affects a subsequent flotation operation, sometimes adversely and sometimes beneficially.

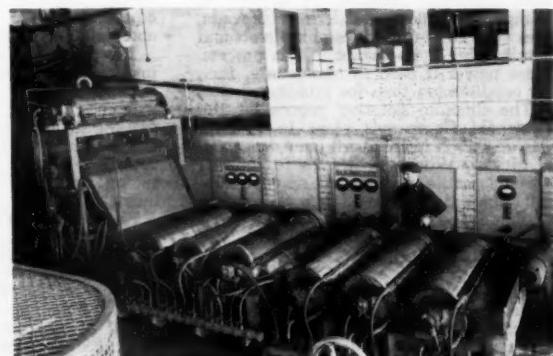
The performance of the Dorr-Oliver, Inc.'s DSM stationary screen received increasing attention during the year. This device was described in a paper by Paul L. Stavenger and Victor R. Reynolds. The screen reportedly has a high capacity for wet screening in the range of 8 to 48 mesh, requires little floor space, and has no moving parts. The screen reportedly will handle 200 to 500 gallons of slurry per minute per foot of width depending upon the particle size and separation size.

In a recount of the newer classification tools, Henry W. Hitzrot, Assistant International Administrator, described the Dorr-Oliver bowl desiltor. This unit, which is not common in the non-ferrous industry, is similar but of cheaper construction than the standard bowl classifier. Present applications are in the glass, sand, and coal industries.

**FLOTATION:** C. L. Sollenberger, supervisor, Process Section, Research Laboratories, Allis-Chalmers Manufacturing Company, and R. B. Greenwalt, operating metallurgist, Cleveland-Cliffs Iron Com-



CINNABAR FLOTATION received a boost in 1957 as three mills used heavy mineral (copper sulphate) activation followed by xanthate collection.



MAGNETIC SEPARATION was of much interest in Scandinavia during the year. This unit is separating magnetite and ilmenite in Finland.

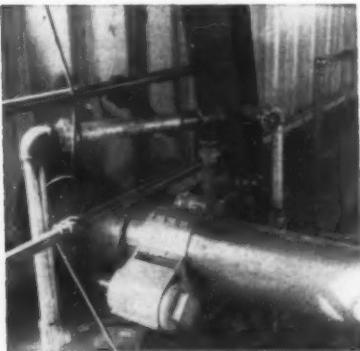
## Ore Dressing

pany, described laboratory results of various silicates used in flotation processes. Silicates having a silicate-to-soda ratio in the range of 2.4 to 2.9 were proven most effective of the silicates when used in the range of 4.0 pounds per ton. When lesser quantities were used, there was not much difference in the performance of various silicates.

Marcello Billi, director, reviewed the lead-zinc flotation plant of Azienda Minerale Metallici in Italy. Vittorio Manfredi's process for the flotation of calomel by same company was described. Heating during the sulfidation step was essential in this process.

The molybdenum-copper flotation separation process at American Smelting and Refining Company's Silver Bell, Arizona mill was described. This process is basically the same as Phelps Dodge Corporation's Morenci process, which involves the use of sodium ferrocyanide and sodium cyanide as depressants. No roasting or pulp heating is employed.

Carl Rampacek, supervising metallurgist, Southwest Experimental Station, U. S. Bureau of Mines, and William A. McKinney, extractive metallurgist, U. S. Bureau of Mines, reported on their investigation of the copper segregation process. The oxidized copper ore is



NUCLEAR DENSITY GAUGES attracted much interest for measuring pulp densities in pipes.

heated with a reducing agent and a halide salt at 700°C to produce metallic copper which may then be recovered by ammonium carbonate leaching or by flotation.

A. W. Fahrenwald, consulting metallurgist, Moscow, Idaho, discussed emulsion flotation as contrasted to froth flotation. Emulsion flotation, as applied at Manganese, Inc., Henderson, Nevada, uses very large quantities of reagents and conditioning is important in this process. More power is used at Manganese, Inc., for conditioning than for grinding.

The ilmenite flotation process at the Otannmaki Company's plant in Finland was described in the April issue, page 49, of MINING WORLD by Urmos Runolinna. The magnetite is removed magnetically from the ore, the ore is then thoroughly deslimed and the ilmenite floated in a pulp at a pH of 4.8 with fatty acid. The selection of fatty acid and pH of the pulp are important in this process. Fatty acids rich in oleic and linoleic and low in resin proved best for this process.

Keith Kunze reported in MINING WORLD, September, page 64, on the mercury flotation process now being used in three mills in the Nevada-Oregon district. Former literature on mercury flota-

tion cited the use of sodium silicate and sodium carbonate for dispersion. Mr. Kunze, general superintendent, Getchell Mines, Inc., asserts these reagents are definitely detrimental to cinnabar flotation. His studies indicate satisfactory results with heavy metal activation, i.e., copper sulfate followed by collection with xanthates.

At the International Mineral Dressing Congress in Stockholm, S. I. Mitrofanov and V. G. Kusinkaya, Russian metallurgists, presented a paper on the use of sodium sulfide for desorption of flotation reagents from bulk sulfite flotation concentrates. This practice is presently being used in lead-zinc flotation separation at the Leninogorsk lead-zinc concentrator.

M. Rey, professor, Ecole des Mines de Paris, discussed the differential flotation of lead-zinc ores in regard to reagent practices related to the geologic state of the ore.

P. G. Kihlstedt, Swedish Royal Institute of Technology, described the flotation of Scandinavian hematite with tall oil emulsions. This process was a two-stage flotation arrangement with apatite removal.

M. A. Ejeles, Institute for Mineral Raw materials, Moscow, reviewed the effect of depressants in non-sulfide flotation. A new contact measurement technique was described where the effectiveness of depressants was measured without the use of collectors. He concludes that, in non-sulfide flotation, depressants also affect the natural wettability of the minerals even in the absence of collectors.

**MAGNETIC SEPARATION:** J. Hall Carpenter, Carpcop Manufacturing, Inc., discussed low intensity rotating magnetic field separating devices. His development of an induced roll separator with lift type action now in use in Australia was described. This apparatus is used for separations of minerals with relatively small differences in magnetic susceptibility. An interesting commentary in this paper was made on the possible future of wet high-intensity magnetic separation.

P. E. Cavanaugh, director of metallurgy, Ontario Research Foundation, and E. W. Williams, Research Cottrell Fellow, Department of Engineering & Metallurgy, Ontario Research Foundation, outlined the development of new dry magnetic separation devices developed at the Ontario Research Foundation. These machines provide concentrations of all particle sizes including dust by dry magnetic methods. Four types of equipment were designed, constructed, and tested for specific uses.

Dry magnetic concentration was also under development in Sweden and Finland in the iron ore industries. These machines involve a drum separator operating at very high speed, in which the non-magnetic material is thrown off by centrifugal force. (see Technology chapter on European Metallurgical Developments).

**ELECTROSTATIC SEPARATION:** Electrostatic concentration received more attention than usual during the year. F. N. Oberg and E. Northcott, Manager of Applied Research, International Mineral & Chemical Corporation described the application of the Le-Baron-Lauver free-fall process for the electrostatic concentration of phosphate ore.

James E. Lawyer, Research Specialist,

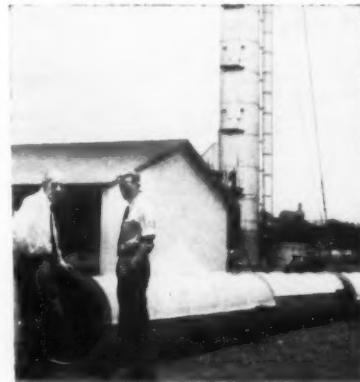
International Minerals & Chemical Corporation presented a paper on the fundamental aspects of electrostatic concentration of minerals as related to solid state physics.

The pilot plant results using electrostatic separation for concentration of feldspar was related by E. Northcott and I. M. LeBaron, Director of Research, International Minerals & Chemical Corporation.

The different electrostatic effects with static fields and high tension current fields was discussed in an article by J. Hall Carpenter, partner, Carpcop Research & Engineering. He pointed out that in high tension fields polarity has little or no effect, and that mineral coating may not be so significant.

The separation plant at the Golding Keene Company mill at Keene, New Hampshire, using the electrostatic process for the separation of feldspar, was described by Grant S. Diamond. The Quaker Oats separator is being utilized in this plant.

The use of electrostatic separation for the concentration of scheelite was described by R. E. Barthelemy in MINING WORLD, September, Page 79. This separation was from a preconcentrate of



FIBER GLASS STACK 200 feet long was used at Chibuluma cobalt plant to resist corrosion.

scheelite and sulfides. Drying to 235°F. was necessary prior to electrostatic concentration in this laboratory process.

**GRAVITY CONCENTRATION:** A comprehensive review of the many years of Humphreys' spiral concentration was presented by James V. Thompson, now with Kaiser Engineers. The application of some 8,500 spirals now being used was outlined. The majority of the spirals are now applied in the concentration of beach sands although the use on the Iron Range is increasing.

G. W. Covier, University of Alberta, C. A. Shook, and E. O. Lilge, Department of Mining & Metallurgy, University of Alberta, reported on the fundamental study of fine suspensions of magnetite, galena, and ferrosilicon using a rotational viscosimeter. A definite relationship was established between the apparent viscosity and the rate of particle motion.

At the International Mineral Dressing Congress, G. Gerth, German Metallurgist, discussed the influence of ore surface properties particle size and medium size on adhesion losses in heavy-media separation. Flat-shaped minerals exhibited the greatest losses. Medium losses were

## Ore Dressing

also related to medium density and particle size, where a finer medium resulted in the greatest loss.

More interest was generated during the year in the use of spherical ferrosilicon in heavy media processes.

The manufacture of a double-deck coal cleaning table was announced by Deister Concentrator Company. This device was designed for reducing floor space requirements in tabling processes.

The design of heavy-media cones has evidently been improved in regard to startup difficulties. Several plants have been reported operating on day shift only.

**DEWATERING:** The use of top feed and horizontal filters received increasing attention during the year. These filters are being used and tested for applications where heretofore their application was judged impractical.

Dorr-Oliver announced the use of air lift circulation in its disc filters. These air lifts return classified coarse material from the filter tank to mix with incoming feed.

Agitation prior to filtration has been reported as effective in some applications for reducing the moisture content of filter cakes.

**AUTOMATION AND CONTROLS:** An automatic titrator for control of lime pH was announced by the Industrial Physics and Electronics Company of Salt Lake City, Utah. This device is being used by the Anaconda Company.

W. C. Knopf and Gene Samsel described the use of the Geiger counter for control analyses of sylvite and feldspar ores. The present practice uses batch determinations but development of a continuous apparatus is under way.

Research Cottrell, Inc. announced complete automation of electrical precipitation equipment. Their system monitors spark gap and readjusts for optimum voltage and power input.

El Control, Ltd. announced the pro-

duction of a bin control apparatus which utilizes proximity switches in the bin. These switches may be wired to activate the conveyor drive motor when desired.

P. J. Stewart described the use of a gamma gauge for determining percent solids in mill pulps including even ferrosilicon media.

The control system in the East Anaconda crushing plant was discussed by Melvin A. Stokke, Anaconda's construction superintendent. The communication system is important to this operation and includes radio, teletype, and telephone. An electronic weighing system is used and provisions are included for stopping equipment when a conveyor belt becomes ripped.

**MATERIALS HANDLING:** W. S. All Steel conveyors are presently being manufactured and tested in Great Britain. These conveyors negotiate curves, convey on slopes up to 32° and will handle material with a temperature up to 700° C. Construction is sectional with overlapping curve steel plants.

DuPont and Link-Belt companies conducted tests on light, thin, four-ply nylon conveyor belt, as compared with five-ply cotton belt. The belts had approximately the same strength but greater flexing was possible with the four-ply belt. The largest one-piece conveyor was described by B. F. Goodrich, a 60-inch belt, 1,000 feet long, weighing 22 tons. This belt is for iron ore in Puerto Ordaz, Venezuela, and will convey 100 tons per minute. Joy announced the marketing of a prefabricated conveyor system which can be put together on the job, including idlers and walkways. Frank G. Stulley of Chain Belt Company described the new form sprag conveyor holdback. Reportedly, this holdback requires less maintenance and has greater dependability than conventional type holdbacks.

**MILL DESIGN:** E. H. Bronson, Canadian consulting engineer, recounted the

problems encountered in designing foundations for mill buildings on clay and permafrost in the far north.

Bituminous Coal Research, Inc. has developed a new type bin discharge unit for wet coal and other wet materials. This device has no moving parts or vibrators and consists of a double cone discharge opening which is set to maintain the material in an unpacked state in the bottom of the bin.

A heating installation for preventing ore freezing in bins and chutes was described by Bruce E. Allgaier, manager, Idaho Mining Company. This apparatus utilizes a heating cable with aluminum foil for radiation.

**GENERAL:** More attention was given to dwindling water supplies and to conservation of water in arid mining regions. Tests were started at the Chino, Mines Division, New Mexico, of Kennecott Copper Corporation using ethyl alcohol to reduce water evaporation in reservoirs.

Pierre M. Guy discussed a new theory of sampling based on statistical mathematics. He brought out the point that often sampling systems are more accurate than necessary due to the limits of chemical analytical accuracy. A. H. Blythe described the conveyor belt samples of the Marcona Mining Company in Peru, which cuts a sample from the full width of a 42-inch belt handling 1,900 tons per hour.

The Coulter Industrial Company announced laboratory apparatus for precise particle size measurements in the 1 to 100 micron size range.

The proper use of the yardstick of mill performance, (mill operating records and accounts) was described by Nathaniel Herz, formerly chief metallurgist, Homestake Mining Company.

A method for computing balances in metallurgical circuits by the moment method was presented by E. B. Fitch and E. J. Roberts of Dorr-Oliver, Inc.

signed and erected. This mill, which is still operating, was designated as the "Trout Lake Concentrator."

The second plant erected was in 1912 at the Hawkins mine of the International Harvester Company and the third plant was the Harrison concentrator of Butler Brothers erected in 1914. Other washing plants followed in rapid succession.

The original Trout Lake flow scheme was a remarkable achievement because it remained essentially unchanged for 15 years in this and the subsequent plants erected during that time. The only noteworthy change during this period was the introduction of conveyor belts for handling crude ore.

Then bowl-type classifiers replaced the shaking tables. Vibrating screens were substituted for the trommel screens. A combination of vibrating screens and standard Dorr or Akins type classifiers replaced the log washers. Crushers were also installed to break the ore pieces in order to liberate more of the silica sand from the ore pieces.

**WASHING:** In the first plants, shaking tables were used for recovery of fines but these were subsequently abandoned. Recently there has been a revival of interest in additional recovery from the fine classifier overflows. Most of the plants now use spirals for recovery of fine iron minerals. In the more-or-less standard flow scheme for this purpose, the classifier overflow is

## After 50 Years of Iron Beneficiation the World Still Copies Mesabi Range Practice



By STEPHEN E. ERICKSON

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The 50th anniversary of iron ore beneficiation was celebrated in August 1957 and most of the beneficiation plants on the Mesabi Range held open house for the public.

As is true at any anniversary time, it is of interest to pause and consider briefly the progress that has been made in 50 years and where the future course of beneficiation is leading, as well as to consider in detail the progress that has been made in the past year.

The first attempt to beneficiate the so-called wash ore was a test made in a log washer in Georgia in 1901. Additional experiments were conducted in 1902, 1903, and 1904. These early experiments demonstrated that it was possible to separate the sand from the ore pieces in the lower grade ores of the western Mesabi Range.

In 1907 the Oliver Iron Mining Company built an experimental mill at Colemine; during the seasons of 1907 and 1908, large-scale test work was carried on and various machines were tried for the treatment of the overflow of the log washer. A workable flow scheme was evolved and a permanent mill was de-

## Iron Ore Beneficiation

pumped to desliming cyclones. The cyclone overflow is sent to waste and the underflow goes to spirals. Usually there are only rougher and cleaner spirals and they are used in the ratio of two roughers to one cleaner.

As with other devices, the pocket sizer is no universal cure-all because tests on some types of ores indicate that it offers little or no advantage. It is a useful tool to assist spiral operation and when new spiral plants are under consideration test work should be conducted to determine the applicability of the pocket sizer.

In the early plants, trommel screens and log washers were used to "scrub" or abrade the ore. These were abandoned but recently there has been a revival of interest in "scrubbing." This started several years ago when the abrasion milling process was adopted in a few plants to treat minus- $\frac{1}{4}$ -inch classifier product. In abrasion milling, the ore is ground in a ball mill using a light charge of grinding media. The power consumption is relatively low. With this procedure on amenable ores, the siliceous material is ground finer than the iron minerals so that it can be removed by subsequent washing or classification methods.

Scrubbing of coarse material has been of growing interest recently. A few operators have installed log washers for this purpose but in general they are not favored because of high maintenance costs and because of the difficulty of starting up under load in case of a power failure. The type of scrubber now in favor consists of a cylindrical vessel similar to a ball mill but in which no extraneous grinding media is used. Lifters are used in the scrubber so that the material can be rather violently thrown together for scrubbing and abrasion. The application of rotary scrubbers is so new that many points regarding lifter design, length versus diameter, power, and retention time are still subject to discussion and test work. Even though the theories of scrubbing are the subject of hot debate it appears that the benefits obtainable, in terms of higher concentrate grade, are so well established that scrubbers have been installed or are being considered for a considerable number of plants.

**HEAVY MEDIA PROCESS:** There has been little change in heavy media practice for several years. Most operators now use somewhat more magnetic separator capacity than formerly. This is because of general elimination of wash water thickeners which means that the magnetic separators receive a greater volume of pulp with a considerably lower content of magnetics.

As the ores have gotten poorer and the demands for higher concentrate grade have increased there has been a tendency to operate the heavy media process at higher separating gravities. This has made it necessary to operate with cleaner media and this too has necessitated increased magnetic separator capacity as well as larger media densifiers.

There is a great deal of interest in the use of spherical media. This material is produced by the Knapack concern in Germany by atomizing molten ferrosilicon. One company on the Range reports a short plant test with this type of ferrosilicon as being very encouraging with indications of lower media loss, higher separating gravities, and less cleaning of media.

A new vessel for heavy media separation, the "OCC" machine has been undergoing tests on iron ore. This vessel is reported to be in use in a number of coal preparation plants.

In an attempt to obtain cleaner media for plant use and especially in order to reduce viscosity when magnetite is encountered during mining, desliming cyclones have been installed in several plants for pre-cleaning of the ferrosilicon media before the material is fed into the magnetic separators.

**CYCLONE PROCESS:** Several plants have adopted fluid drives for the cyclone feed pumps so that the pressure at the cyclone feed inlet can be controlled easily at an optimum point. This is said to be quite satisfactory.

Another approach to this same problem has been the use of a constant head tank for feeding the cyclone. This has another potential advantage because it would only be necessary to pump the media to the constant head tank while the ore could be fed into the tank by conveyor or bucket elevator. This should normally give lower power consumption and a lower maintenance cost.

Media for use in cyclone concentration has, in the past, been exclusively the magnetite concentrate produced by the taconite concentrators. In 1957 one of the operators installed a small media grinding unit so that material meeting cyclone operating specifications could be produced by grinding of coarse magnetite. This change in the preparation of the cyclone media was said to have given lower media losses and improved cyclone metallurgy.

**SIZING OF CONCENTRATES:** There has been a great deal of new sintering capacity installed at the blast furnaces and in order to facilitate the use of this increased capacity the furnace men are now requiring that the concentrates be screened so that the coarse and fine por-

tions can be shipped separately. The coarse material is charged directly to the furnaces and the fines are sintered. Most of the operators have screened some part of the shipments during 1957 and the indications are that this trend will be accelerated. The usual separation size is  $\frac{3}{8}$ -inch or  $\frac{1}{2}$ -inch. Screening of concentrate introduces the problem of grade because it would be desirable to have both sizes at grade and this means that the grades of two products must be controlled rather than just one.

**FLOTATION:** A Spiral and flotation plant was installed by Jones & Laughlin Steel Corporation in 1957 at the Hill Annex mine to retreat material from an old tailings basin. The material is mined by means of a hydraulic dredge. The material is then pumped to a cyclone where the minus-150-mesh is removed. The deslimed material is sent to spirals where a concentrate is produced.

The spiral rougher tailing is deslimed in a hydroseparator and then ground to minus-65-mesh. The ground product plus the overflow products are deslimed at 20 microns, scrubbed in flotation machines, again deslimed in cyclones. The deslimed material is conditioned at 70 percent in a rotary drum-type conditioner with sulfuric acid, fuel oil, and a petroleum sulfonate. The conditioned pulp is then floated. Conditioning must be above 70 percent solids or a serious loss of iron occurs. Generally satisfactory results were said to have been obtained at this plant.

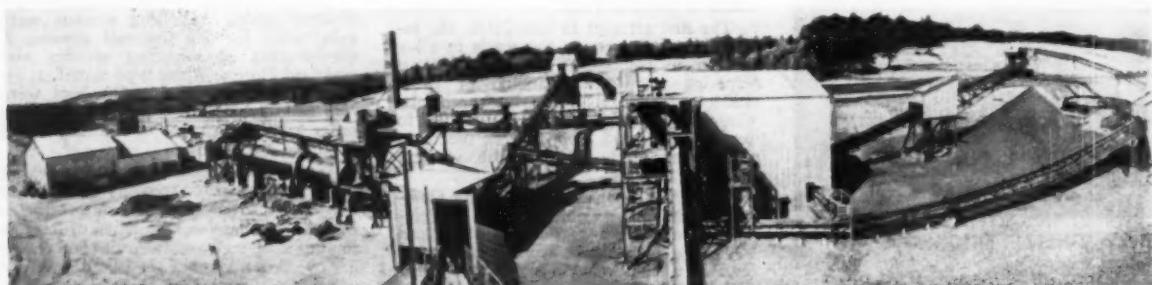
The flotation plants at the Humboldt and Republic Mines of Cleveland Cliffs Iron Company in Michigan operated at full capacity all year.

Plans were also announced by Hanna Coal and Ore Company for construction of a combined spiral and flotation plant to treat the specular hematite ores from the Groveland mine in Michigan.

**DRYING OF ORE:** Drying of a high moisture crude ore as a beneficiation process was used a number of years ago but was abandoned. This process was revived again at Cleveland Cliffs Iron Company's Ore Improvement plant near Negaunee, Michigan. This new plant started operating in 1957 to treat underground ores by means of drying, crushing, screening, and heavy media separation.

**TACONITE CONCENTRATION:** Reserve Mining Company's taconite concentrator at Silver Bay completed the second full year's operation. Shipments totaled over 5,000,000 tons of pellets in 1957.

Erie Mining Company's Hoy Lakes taconite plant was practically completed by the end of the year and most of the plant equipment was being "tuned-up." Full operation at the designed rate of



**EAGLE MILLS** ore improvement plant of Cleveland-Cliffs Iron Company is first to be built to treat underground ore by three processes. Drying,

screening, and heavy media separation improve physical character and raise iron content of Marquette Range ores.

## Iron Ore Beneficiation

7,500,000 tons of pellets per year is expected in the first half of 1958.

The taconite concentrator of Hilton Mines near Ottawa in Canada was completed and ready to start operation at the end of 1957.

The flow schemes of all these taconite concentrators are basically quite similar and have been described many times in the recent technical literature.

**AGGLOMERATION:** As mentioned above there have been a number of new sintering plants placed in operation at the blast furnaces and for this reason a considerable amount of concentrate has been sized before shipment in 1957 so that the fines can be readily sintered and the coarse charged directly to the furnaces.

A considerable amount of development work is still in progress on methods of agglomerating or pelletizing of the fine concentrates produced from the taconite concentrators.

The Erie, Marmora, and Hilton plants use balling drums and a shaft furnace. The Reserve plant uses balling drums and a traveling grate for heat treatment. At Eagle Mills in Michigan, a balling disc is used and the heat treatment of the pellets is on a traveling grate which is operated by updraft circulation of gases.

Oliver Iron Mining's Extaca plant is still testing a standard sintering machine and a rotary nodulizing kiln.

The latest development in pelletizing is a grate-kiln pilot plant which is being operated by Allis-Chalmers. In this process the wet pellets are formed with a balling disc. They are then treated in a short rotary kiln which dries and hardens the pellets. The partially finished pellets are then discharged onto a traveling grate machine where the heat treatment is completed. This method is

claimed to give a superior pellet in regard to hardness and abrasion resistance. The indicated heat consumption appears to be somewhat lower than with other methods of pelletizing.

**OTHER PROCESSES:** Various methods of concentrating the low-grade finer grained ore reserves are being actively tested and discussed at the present time, but so far there has been no indication of serious consideration of large-scale continuous pilot plant work. Among these processes, the following are of interest.

Reduction roasting followed by magnetic concentration has been discussed for some time and much test work has been conducted. This process has definite advantages, such as the simplicity of magnetic separation, and definite disadvantages such as the high cost of the necessary heat.

Flotation has been tested for non-magnetic taconites and is being used on the favorable specular hematite ores of Michigan. In Minnesota, the earthy character of much of the ore, the slime content, and the variations within a given mine all offer serious obstacles to the process.

A new process that is under intensive study is the dry High Intensity magnetic separation process which has been in successful use in Germany for a number of years. In this process the hematite is recovered by magnetic methods. The ore must be dried, however, and this could be a problem.

There has been a considerable interest in direct reduction processes that would produce a relatively pure iron product. This has some of the same features as the reduction roasting process except that the reduction step would be carried to metallic iron instead of only to magnetite. This means that a final product assaying

about 95 percent iron could be obtained instead of a magnetite concentrate which would assay around 65 percent iron. This process requires considerable amounts of heat and is operated at higher temperatures than the reduction roasting process. However, when all the cost figures are available and when all of the advantages and disadvantages are tallied, it could very well be that a direct reduction process will prove to be the best method of concentrating the lower grade earthy, non-magnetic ore materials, not only of the Mesabi Range but in other districts as well.

**FUTURE TRENDS:** A modern blast furnace plant is very expensive to construct. With the availability of high-grade foreign ores and taconite concentrate pellets, it has been proven that by a proper selection of the iron ores for the blast furnace charge, increased furnace productivity can be obtained at relatively low cost. Therefore, there is more and more demand for materials that are high grade and that have the most advantageous structure. This means that more attention is being given to beneficiation methods in all of the iron ore districts.

Even in Labrador where there are large reserves of desirable direct shipping ore, the past year saw the operation of a pilot plant for spiral concentration of the lower grade specular ores. These ores are readily amenable to grinding by means of an Aerofall mill and can be readily concentrated to a very high-grade product by means of spirals.

There is reason to believe that in the future all materials charged into a blast furnace will be beneficiated, either to improve the physical structure or to improve the chemical composition or both.

This water current can be so regulated that either the overflow is practically free of solid matter or a secondary desliming effect is brought about.

The action of the underwater screen is marked by the pulsating motion of the water. Therefore only very fine particles that are so difficult to separate in normal dry screening operations are first washed out of the feed material. In the water bath no capillary effects can take place within the feed whereas normal spray-screening is strongly impeded by such capillary effects. The sizing process does not require much water. This is mainly due to the high rate of sedimentation of the screen undersize, or the washed-off finest-sized matter, respectively.

The trough-shaped middle-piece of the screen surface (for finest size screening usually bar-screen surfaces are used) lies approximately 12 inches below the water level whose height is adjustable by an overflow weir. Two ends of the screen surface protrude above the water line so that the discharge side slowly ascends and is of such length that effective de-watering of the screen-oversize is ensured. The undersize sinks into the funnel at a quick rate which is due to the light vibratory motion of the funnel. At the lowest point the fines leave the funnel through an orifice of adjustable width. The adjustment of this orifice is determined by the volume of water that is caused to flow through the upstream-channel, on the rear side of the funnel, to the overflow weir where it is discharged.

Underwater screening has a broad field of application. Fine classification is performed with a high degree of separating accuracy and throughput rates. For instance, with 1-millimeter-wide bar-screen apertures the hourly throughput capacities of 3 to 4 cubic meters per square meter of screening surface are obtained. With 6 millimeter round-hole screens, approximately 15 cubic meters per square meter.

Underwater screening has been effective in European and United States heavy media plants first, to remove any slime or fine material in the feed, and second, to thoroughly wash the products free of all entrained media. Excellent results have been attained, even for washing porous and pitted material from which the media can be washed only with difficulty.

## New In Europe—Underwater Screening; Magnetic Separation, and Rock Grinding

Metallurgical development highlights in Europe in 1957 centered on: (1) Underwater screening of fine pulps; (2) efforts to develop high capacity magnetic separators; and (3) a reappraisal of all types of grinding.

To this list of metallurgical events must be added the International Mineral Dressing Conference held in Stockholm, Sweden in September. Reference is made to some of the outstanding papers at this conference in the other sections of this Technological Review.

**UNDERWATER SCREENING:** The necessity for wet screening of fine materials is of ever growing importance; however, the difficulties are increasing as the material gets finer and capacity decreases. Now, the modern underwater screen is able to operate properly in the sizing range between 0.75 and 10 millimeters at throughput rates per unit of screen surface that are three to four times higher than those of standard screens. This may be the reason why mineral dressing engineers from many countries paid so much attention to the Klockner-Humboldt-Deutz opposed-vibrating underwater screen which was exhibited at the German Industry Fair in Hanover in 1957.

## European Metallurgy

By the end of 1957 the underwater screens in sizes up to 55 inches in width and 13 feet long were being used in five countries for more than 25 different applications. Materials being screened include: placer gravel, German iron ores, diamond-bearing rock, fluorspar, sand and gravel, and coal.

**MAGNETIC SEPARATION DEVELOPMENTS AND TRENDS:** Efforts to develop magnetic separators with high capacity for concentration of both weak and strong magnetic fine grained iron ores was the dominating trend in metallurgy in Scandinavia and Western Germany in 1957. The reason—it will be necessary to treat larger tonnages of the low-grade, fine-grained and intergrown iron ores of the countries.

In general, strongly magnetic fine-grained iron ores were almost exclusively treated in wet, low-intensity, pickup separators. Dry methods are sometimes used for retreating dried concentrates produced by wet separators to remove undesired minerals of lower magnetic susceptibility.

Laboratory tests in Finland proved that dry magnetic separation could be improved if, during grinding or drying, reagents are added to the ore to impart to the ore particles a mutually repelling effect.

Scandinavia makes broadest possible use of the more expensive but fool-proof permanent magnetic separator for concentrating magnetite ores. Much work is being done to increase its field intensity by employing magnetic materials with improved properties and by trying to pack as much as possible of such material into the drum. With the Laurila separator the magnetic field can be regularly weakened during operation of the machine; this may be of advantage if impurities of somewhat lower magnetic attractability are to be removed from magnetite concentrate.

The new Humboldt wet drum separator (1,000 millimeter diameter and 1,800 millimeter drum width)—supposedly the largest of its kind in Europe—was installed in a number of mills. Energy con-

sumption of its magnet system which is equipped with five alternating poles, is 6 kilowatts under conditions of continuous operation. When treating beach sand in a Canadian plant, this separator reached an hourly throughput rate of 90 tons. With two separations and consecutive wet mechanical removal of an ilmenite-enriched product, a 65 percent Fe concentrate is recovered from sands containing between 3 and 5 percent magnetite.

In a German sink float plant for brown iron ore this type separator recovers 14 tons per hour of ferrosilicon.

For treatment of weakly magnetic iron ores (hematite, brown iron) in high-intensity magnetic fields—a problem upon which much attention is being focussed—two events seem to be of far-reaching importance:

The high-intensity dry magnetic separator developed by Goltz (Salzgitter) will soon be put into operation in a plant of the Hüttenwerke Peine-Ilsede. This separator has two magnet rolls each of 800 millimeter width and operates at very high field-intensity. Its throughput rate is reported to reach 10 tons per hour. Tailing of less than 5 percent Fe is said to have been produced after several magnetic retreatment stages. In order to avoid contamination of the concentrate by entrained waste dust, an draft air current is maintained in the separation gap.

**EUROPEAN VIEWS ON DRY AND WET GRINDING:** No basic changes occurred in grinding practice in Europe during 1957. The long tendency to impact crushing continues. Aside from special cases, wet grinding in rod or ball mills predominates.

However, testing, calculation, and evaluation of both wet and dry grinding received, and will continue to receive, the attention of European metallurgists. Here are currents views of a number of metallurgists on the subject:

The costs of the grinding process proper—as confined to the mill unit—are of the same order for wet and dry grinding unless the cost of electricity is exces-

sive. (Under comparable conditions the power demand of wet grinding is lower, whereas with dry grinding the rate of wear on grinding media and mill lining is lower thus resulting in reduced maintenance cost).

Today wet operating classifiers are, as a rule, still more efficient and require less power and space than dry classifying equipment of comparable capacity so that under the common conditions of closed-circuit grinding economy swings to the side of wet grinding.

Where wet feed is to be ground or the ground product—as is usually the case in ore dressing—is to be wet treated subsequently (wet gravity concentration; flotation; wet magnetic treatment), wet grinding is preferable. Moreover, as recent scientific findings seem to indicate, the addition of surface activation reagents during wet grinding may raise its efficiency so in future this may also favor wet grinding.

In the relatively few cases where the ground ore is to be dry-processed, however, it must be carefully examined whether dry grinding is to be preferred. This also applies to one of today's major ore dressing problems, i.e. the beneficiation of lean finely intergrown iron ores containing weakly magnetic minerals that are to be concentrated on dry magnetic high-intensity separators.

Theoretic considerations on the mode of operation, as well as some reports on practical experience gathered with rock grinding units in ore dressing plants, seem to indicate that under certain conditions the operating cost of plants can be substantially lowered by the application of dry operating air-swept crusher-mill combination.

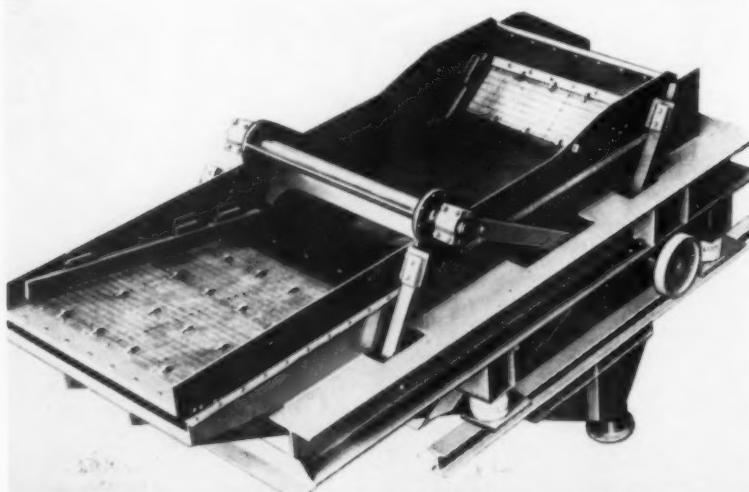
The outstanding advantage of such is its high reduction ratio which permits the comminution of coarse feed material to considerable fineness in one pass through the mill. Therefore, against multi-stage reduction in conventional crushers and mills of lower reduction ratio, the use of rock grinding mills may often lead to substantial savings in investment and operating costs for crushers and grinding mills and their auxiliary equipment, as well as to lower space requirements, simplified flow-sheets, and plants that are easy to supervise. These advantages will become more tangible as the throughput rate of the plant increases.

If the kind of ore and the requirements as to the recovery rate permit, finest dust particles can be removed by air separation from the ground product before it undergoes wet treatment. This will have a favorable influence on the sludge problem which often is a source of serious trouble.

Under such concepts the application of these mills for large-scale reduction of low-grade ores, particularly lean iron ores which are to be dry-magnetically concentrated, seems to involve essential advantages. This, however, is an acute problem which in the future will even increase in importance.

Much more practical data on as many different ores as possible will be required in order to bring out clearly the advantages on the one hand, and, on the other hand, the limitations as to the range of economic application of this interesting crusher-mill combination.

In spite of the existing uncertainty, however, some large German companies are reported as seriously considering the problems of using rock grinding mills.



UNDERWATER SCREENS developed in Germany have found wide application for screening iron ores, diamond bearing rock, fluorspar, and other minerals in many countries.

# Sink, Drift, Raise, and Muck Faster With Better Planning and New Machines



By RICHARD M. STEWART  
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Speed makes money in underground mining today. Faster development cycles mean higher tonnage rates which in turn makes costs lower.

Operators are designing new machines and coordinating mining plans to keep those machines at the face more hours per shift. The following results clearly indicate that underground miners are doing a remarkable job.

**SHAFT SINKING:** Outstanding progress in circular shaft sinking has been achieved in South Africa. Recent mechanization of their sinking methods has resulted in establishing new world's records. The unique feature of their sinking method is simultaneous sinking and concreting. A multi-deck Galloway stage is used to place concrete forms and to pour concrete while a crew in the bottom proceeds with drilling or mucking in the sinking operation.

A record of 834 feet of sinking was achieved in 30 days with an excavated diameter of 30 feet. In September, 1957, Free State Saaiplaas Gold Mining Company, Ltd., a member of the New Consolidated Gold Field Ltd.'s. group established this record in the biggest shaft in South Africa, if not in the world. The finished diameter, inside of concrete, is 27.5 feet.

At Saaiplaas, three precentration boreholes were put down around the perimeter of the shaft and 30 feet away from it. They were drilled to a depth of 2,240 feet and a total of 6,755 pockets of quick-drying cement injected. The success of this was shown by the interception of a number of concrete-filled fissures in the course of sinking.

The planned depth is 6,400 feet. One key to the success is the tremendous size of the equipment used. The sinking stage weighing 21 tons has three fixed decks 15 feet apart. A modified Vlakfontein-type cactus grab is used for mucking. The grab weighs four tons and has a capacity of 20 cubic feet—equal to about one ton of country rock—and is capable of loading up to 300 tons an hour. The broken muck is loaded in 185-cubic-foot buckets (approximately 9.25 tons). Three

buckets are kept in constant operation during cleaning operations, with two on the bottom and one in transit. The best loading performance was 28 buckets an hour in shale and 18 in hard rock.

Drilling is done with 26, hand-held, three-inch sinkers, weighing 80 pounds each, using tungsten carbide tipped steel in 72 inch and 110 inch lengths. In the Karroo shale, 146 holes in concentric circles were drilled in each round. In the harder ground of the Ventersdorp lava, 170 holes were required. A hole director is used to accurately position each hole.

Concrete lining proceeded simultaneously with sinking and during the month 810 feet of this was completed. Pipelines carried 4,600 cubic yards of premixed concrete down to the sinking platform during the month.

Several new shafts—both vertical and sub-vertical—are in progress in South Africa. Western Holdings, Ltd. has started on a 24-foot-diameter main hoisting shaft. Recent developments have been the Blair stage hoist which is designed for sinking to a depth of 10,000 feet. Another Blair innovation is a two-part line used on skips, which will permit hoisting ore from 10,000 feet in one lift.

A recent experiment in skip hoisting was quite interesting. Normally the steel "hat" guides are supported by steel or concrete dividers every 15 feet. Hoisting speeds vary from 2,500 to 4,000 feet per minute. In this test guides were supported, first at 30-foot centers, then at 60-foot centers. There was no significant movement of the guides at 30 feet and the deflection amounted to only 1/4 inch when guides were fastened at 60-foot centers. The trend is toward greater distances between guide supports. In the future it may be possible to eliminate all steel members in the shafts and use wire rope guides for skips and cages.

Rieback Gold Mining Company, Ltd. in the Orange Free State is putting down a 26-foot-internal-diameter shaft with a planned final depth of 5,800 feet. This project also involved precentration and, in addition, equipping with buntons, guides, and a brattice wall simultaneously with the sinking and lining.

The Hartebeestfontein Gold Mining Company, Ltd.'s. No. 2A sub-vertical shaft is collared at the 3,500-foot level and will be sunk to approximately 7,000 feet. The internal diameter is 24 feet 1 inch. An unusual feature is the nine-deck sinking stage. The total length of the structure is 60 feet. It has three platforms and six catwalks. A 20-cubic-foot-capacity mechanical grab is being used for cleaning out, and all broken rock is removed to surface by way of No. 2 shaft. An interesting feature of the rock transportation system is the 42-inch conveyor belt which carries muck from the sub-vertical shaft to the skip loading bins at No. 2 shaft at a speed of about 412 feet per minute.

A major project is under way at Western Deep Levels Limited in South Africa. Two systems of twin shafts, each system consisting of a 26-foot-internal-diameter hoisting shaft and a 20-foot-internal-diameter ventilation shaft, have been started. The main and ventilation shafts of each system are 200 feet apart from center to center. The two systems

are about 8,500 feet apart. The ultimate depth of these shafts will be 6,000 feet.

Eventually a deep level system will be collared at the 5,800-foot level and sunk to 10,000 feet. These sub-vertical shafts will be 24 feet in diameter for hoisting and 18 feet in diameter for ventilation.

At present surface installations are completed for sinking operations which started in early 1958. An important development here is the use of concrete head frames. The two ventilation shafts have circular concrete head frames 73 feet high, which were poured continuously with slip forms. Square concrete head frames have been constructed for the hoisting shaft.

Four precentration holes are being drilled around the periphery of each shaft, each hole being collared 30 feet from the shaft center. Quick-drying cement is distributed to the drilling rigs through individual feed-pipes from a central mixing plant. Six injector pumps and three double-tank mixing bins are housed in each of two cement distribution sheds.

It is planned to drill 90 7-foot holes per round in the ventilation shafts and 120 holes per round in the hoisting shafts. Of the four shafts, the two main shafts and one ventilation shaft are equipped for mechanical mucking; the other ventilation shaft will be hand mucked. The three grabs supplied to Western Deep Levels by Sturrocks Ltd. are designed on the same lines as the one which was instrumental in setting the world record at Free State Saaiplaas. All have a capacity of 20 cubic feet and all are fitted with a by-pass on the air cylinder, which allows the operator greater control of fine movement.

A new development has been made on the sinking stages for use in the mechanically cleaned shafts. They are seven-deck Galloway stages, 80 feet high, designed so that the bottom two decks of each stage are capable of independent movement. The bottom two decks from which the mechanical mucker is suspended can be lowered to the desired mucking position near the shaft bottom, while the remaining five decks are fixed in place for concreting operations. This again, shows careful planning to permit simultaneous mucking and concreting operations.

At Homestake Mining Company, Lead, South Dakota, a 19-foot-diameter circular shaft is being raised from deep levels and sunk from surface. Drifts were driven to the shaft site on five levels between the 2,000- and 5,000-foot levels. Pilot raises 7 by 9 feet were driven vertically approximately 900 feet to connect the drifts. The one above the 2,000-foot level was driven 935 feet before ground conditions made it advisable to stop. This left 970 feet to be sunk from surface. A six-machine jumbo was used for drilling a 90-hole burn cut round. Holes were drilled with 9.5-foot-long,  $\frac{3}{4}$ -inch hex steel, with  $\frac{1}{8}$ -inch tungsten carbide insert bits. A single steel change was used with the long automatic feed machines. A model 630 Eimco rocker shovel is used for mucking. The crew installs steel sets and 14 gauge corrugated lacing after mucking. When five sets, or 50 feet of steel, have been installed, concrete is poured. Air-intramed concrete is trucked from the company mixing plant to the shaft collar.

The M. A. Hanna Company is sinking a new shaft in the Mineral Hills area, Iron River, Michigan. The shaft is 20 feet inside diameter, and will be 2,600

## Underground Mining

feet in depth. The circular section was chosen in order to keep the shaft as dry as possible for the friction-type hoist system. It is being sunk by Walsh Construction Company. They are using a specially designed four-machine jumbo, Eimco 630 mucker, and 30-foot forms which are suspended in the shaft and will not come out until the job is completed. Steel sets are being carried down as sinking progresses. The sets are on 10-foot centers and three sets are usually installed at one time immediately following a concrete pour. When sinking operations are completed, a Koepe-type hoist will be mounted in the head frame. Future rock hoisting skips will be of 15-ton capacity.

The Anaconda Company in Butte, Montana is planning a 24-foot-diameter circular shaft at the Ryan Mine. This shaft will have hoisting facilities for 15,000 tons of ore per day using four 15-ton bottom dump skips. The shaft will also accommodate a double-deck service cage with a floor area 5.25 by 13.0 feet. A second circular shaft is being currently sunk in Butte. The Modoc ventilation shaft has a 16-foot-diameter inside of concrete. A two-deck sinking platform is being used.

In Canada, the Potash Company of America Ltd., is sinking a 16-foot-diameter shaft near Saskatoon Saskatchewan. This Company is now sinking a large production shaft to a depth of approximately 3,500 feet. They are using a sinking stage very similar to the Galloway stage used in South Africa. Production will come from "potash beds" at a depth of 3,100 feet. The mine plant has been designed for a capacity of 4,000 to 4,500 tons of ore per day, or approximately 1,500,000 annually. Provisions have been made for a substantial expansion, should this be warranted at a later date.

Ground conditions in Saskatchewan are difficult, with two distinct zones requiring freezing to sufficiently stabilize the ground. One is a glacial till and the other, a sand at approximately 1,300 feet containing water under 1,500 pounds per square inch pressure. P.C.A. has sunk freeze holes from surface to 3,000 feet and, with an elaborate refrigeration system, has frozen the ground through which the shaft is being sunk.

International Minerals and Chemical Corporation of Canada, Ltd. is sinking an 18-foot circular shaft near Esterhazy, Saskatchewan. They expect to reach the "potash beds" at 3,100 feet and will bottom the shaft at 3,500. Utah Construction Company is the contractor and they are using the Cryderman mucker. In this case local freezing is being used successfully to stabilize the unconsolidated glacial till and water-bearing sands.

In England, two 24-foot-diameter shafts are now being sunk approximately 800 feet to coal beds lying under water-bearing alluvial deposits. These shafts are located at the Lea Hall Colliery, approximately eight miles northeast of Cannock. This company is using freezing techniques in order to stabilize the water-bearing strata. The work of lining 800 feet of a 24-foot circular upcast shaft was recently completed. Thirty-four bore holes were drilled around the periphery of the shaft. For a period of approximately a year and a half, 27,000 gallons of cold brine were circulated per hour at a temperature of minus-2° F. When freezing was completed, the shaft was sunk to its ultimate depth through the ice wall. High strength concrete, having an average compressive strength of 6,800 pounds per square inch, and a maximum slump of 2% inches, was poured as a monolithic structure. Experience indicated that a strong and water tight lining of mass concrete can be installed in a shaft sunk by the freezing process. The heat generated by setting concrete does allow the initial "set" to take place before the frost returns to the concrete to retard the curing. The delayed shrinking takes place eventually in the thawing out, and can be dealt with by injection. Minute shrinkage cracks appeared at approximately 30-foot intervals. A flow of 30 gallons per minute was experienced through these cracks. Water-bearing strata had pressures as high as 300 pounds per square inch. Liquid cement was injected behind the concrete lining in order to seal off the flow of water. When this process was completed, the total leakage was  $\frac{1}{2}$  gallon per minute, most of this water was coming through cracks in portions of the shaft where injections of liquid cement were not made.

**RAISING:** A method of driving a vertical raise by use of a cage has been used at the Cary underground iron mine of the Odanah Iron Company, Pickands Mather & Co., managers, Hurley, Wisconsin. This method is similar to that used previously at Tennessee Copper Company. The Cary mine is deepening the mine shaft from the 34th to the 37th level, approximately 600 feet. Crosscuts were driven to the center line of the shaft on the 35th, 36th, and 37th levels which are at 200-foot vertical intervals. All of this work was done in granite, and the majority of the openings were not timbered. The raising method, in general, consisted of a  $\frac{3}{4}$ -inch diamond drill hole between levels through which was passed a hoisting rope to raise and lower a light cage. The cage consisted of a steel framework covered with wire mesh of two-inch openings. It was circular, 4.5 feet in diameter and 7.0 feet high. At the start of the cycle, a hoisting rope was lowered through the diamond drill hole to the level below. The miners then attached the  $\frac{3}{4}$ -inch non-rotating rope to the cage which was pulled into position for hoisting. The drills, steel, etc., were loaded on the cage, and air and water hoses and signal cable attached, and hoisting to the face begun. As the cage was hoisted, the walls were examined and trimmed if necessary. When the face was reached, it was examined for loose rock and trimmed from within the cage. The cage was then spotted about 7 feet from the face, and one of the top sections removed to afford access to the top of the cage. The cage was then spragged in place to prevent it from rotating and drilling was begun. The raise was kept 6 feet, or a little larger, in diameter, requiring 18 to 20 holes, the diamond drill hole serving as the cut. When drilling was completed, the round was loaded, the cage lowered, and the rope and cage removed from the raise. Blasted rock was removed from the bottom of the raise by means of a scraper and 25-horsepower electric slusher. The rock was scraped up the ramp and loaded into 75-cubic-foot cars. On a three-shift-per-day basis, with two miners and a hoistman on each shift, the best footage for one day was 15.0 feet, and the overall average was 10.4 feet per day. When raise was completed, it was enlarged and stripped to the full shaft size.

**TUNNEL DRIVING:** A world record for tunnel driving was established by Doornfontein Gold Mining Co., Ltd., in South Africa. A staggering 1,903 feet was driven in a 9- by 10-foot heading in 26 days. A 32 hole drag cut was drilled with air leg machines, the average footage broken per round was 7.46 ft. Average daily advance was 73.2 feet and the best day's advance was 81 feet in 11 rounds. The average cycle time was 2,456 hours and the best cycle was 2.0 hours. An Eimco model 21 loader was used. Doornfontein is now tackling a twin haulage drive and they are aiming at 3,000 feet in 30 days.

During September 1957, the Utah Construction Company, contracting for Kennecott Copper Corporation, achieved 1,090 feet of advance in a concreted railroad tunnel being driven at Bingham Canyon, Utah.

During the same month, Anaconda's Andes Copper Mining Company advanced a 15- by 17-foot heading 1,405 feet at the new El Salvador mine in Chile. This railroad tunnel is being driven



CHILEAN TRAIN LOADER uses an overshot loader to muck directly into three car train which holds complete round of broken rock from 8-foot round in 15 by 17 foot heading.

## Underground Mining

using a "train loader" or "integrated slusher train." This type of equipment was first used at the Boliden mine in Sweden, and later adapted for use at San Francisco Chemical Company near Montpelier, Idaho. These installations utilized cars with capacities ranging up to approximately 125 cubic feet. The Chilean train loader utilized three 828-cubic-foot cars. An Eimco 105 overshot loader is used to muck the broken rock into a hopper at the heading-end of the train. A 78-inch scraper is used to slide the rock out of the hopper and distribute it along the train of three cars. The scraper slides along grizzly rails at the top of the cars allowing the rocks to fall through the grizzlies into the cars, thus distributing the rock along the length of the train. The AnSCO scraper hoist has remote controls located adjacent to the hopper so that the operator has excellent visibility and can coordinate the movements of the scraper with the action of the Eimco 105. A Joy 50-horsepower, high torque, high slip, slusher hoist is mounted at the portal end of the train. The three-car train was designed to hold all of the rock from an 8-foot round in the 15 by 17 foot heading. If rock is stacked above the grizzly elevation, it is possible to load a 12-foot round.

Important considerations with this type of equipment are: to provide sufficient car volume to hold the entire muck pile so that no car changing is required; to plan the scraping system so that muck can be distributed along the train more rapidly than the rocker shovel can muck it into the hopper. Mucking time with this equipment averages approximately one hour and 15 minutes, while the best time has been 50 minutes. The railroad cars adapted for the train loader at Andes were rated as 45-ton, bottom dump cars.

Recently Oscar Cheff developed a train loader for an 8- by 8-foot heading using side dump cars. An Eimco model 12 was used to muck rock from 4-foot rounds into the train loader in 20 minutes. These headings in water tunnels at the Canyon Ferry dam in Montana were advanced at rates averaging better than 40 feet per day. A round-in-round-out cycle time was established at approximately two hours.

In Butte, research work is progressing on train loaders to be used on 18-inch and 36-inch gauge track. These units will be used for vein mine and block caving mine development. An important development in these train loaders is a device designed to distribute rock while the train loader is being operated on a curve. The train loader system of mucking eliminates car changing in the heading, and as a result usually cuts mucking time in half.

A very important development, of the train loader type, is the BZ 35 manufactured by Salzgitter in West Germany. This machine utilizes a chain conveyor to distribute the rock the length of the train. A rocker shovel loads muck continuously at the rate of 107 cubic feet per minute. The rock is discharged onto a loading conveyor which in turn discharges into the first car where a pneumatic pusher compresses the loose rock. The unique features of this train are the open ended cars, coupled together by articulated joints, and the double strand scraper chain installed in the bottom of the cars. A 40-horsepower chain driving motor is located under the last car of

the train. When the first car has been loaded with rock to its full cross section, the chain conveyor is activated, moving the rock load a few feet along the train, and providing a void into which the loading conveyor discharges rock. The rock is gradually conveyed along the length of the train at the same rate that the rocker shovel loads the train. Twenty-two open ended cars make up the train which has an overall length of 132 feet and a total capacity of 60 tons or 1,250 cubic feet. It is claimed that broken rock up to 2.0 by 3.3 feet in size can be handled. A mine locomotive of nine to 12 tons with a traveling speed of 4.3 to 6.2 miles per hour loaded, and 6.2 to 8.7 miles per hour empty, is utilized for hauling the BZ 35 train. Bends of 66-foot radius can be negotiated when traveling, although loading and discharging has to be confined to straight track. The standard model is designed for use with 24-inch gauge track, but in special cases provision can be made for 21½- to 36-inch tracks. The height of the standard cars is 5 feet 3 inches, while the maximum width is 3 feet 11 inches. The main application of the bunker train obviously is in rapid tunnel driving. It has been used for hydroelectric tunnels in Switzerland.

**TRACKLESS MINING UNDERGROUND:** The increased use of trackless equipment in metal mines is an important trend. One of the first applications of the Eimco 630 rocker shovel was at the Indian Creek mine of the St. Joseph Lead Company in Missouri. There, this tractor-mounted shovel loaded special six-ton trucks. This idea was taken to Africa, where in early 1957, trackless mining began underground at Mufulira, Copper Mines Limited. Previously, rail mounted loaders were used to move the broken rock into Granby cars. This system meant that the track layer had to follow immediately behind the miner, laying his track at high speed so that the heading could be approached without delay. Now with the Eimco 630 and Joy shuttle cars, the trackless equipment can be taken straight to the scene of operations and the track laying for permanent use can be done with more precision at a later date. The Eimco loader and a Joy shuttle car require only

three African workers—two operators on the machines and a hose-boy. In an eight-hour shift, it is possible for this crew of three to move 300 tons of broken ground or 100 tons for each man.

Trackless mining methods that have become standard in the coal mines of the United States have found their way to iron mining in Sweden. At Kiirunavaara, Joy 18 H.R.2 loaders are used in combination with Joy shuttle cars. This combination, operated by two miners, has a capacity of approximately 600 tons a shift. The rock is transferred into an ore pass, dropping to a main haulage level. From these ore passes, the ore is discharged in three-cubic-meter and seven-cubic-meter Granby cars, and hauled to one of four crushing stations. The crushed ore passes into underground storage bins from which it is measured and automatically loaded into 20-ton skips. Hoisting takes place through eight shafts, each of which has a 20-ton bottom dump skip operated with a counter weight and powered by a four-rope ASEA friction-type hoist. Each hoist has a capacity of 500 tons an hour and the whole central plant has a daily capacity of 50,000 tons.

Interesting improvements in trackless equipment have been made by the Montevicchio Company, which operates lead and zinc mines in Sardinia. Prime instruments in a program which saw output nearly doubled were two machines developed by Atlas Copco of Italy, at the request, and to the specifications of the mining company. The cut and fill method of mining is used since subsidence is a problem. A large sink-float plant at the mine site provides a properly sized waste which is delivered to the stopes by chutes. A rubber-tired hauler was designed to place this fill underground or to dump ore down ore passes. This compressed air operated vehicle is now made in two sizes: the standard two-cubic-yard model, which works in the normal stopes, and the one-yard machine which works in narrow drifts and stopes and performs final cleanup.

The next step in the development was a self-loading transported. The loader-hauler is a multiple use machine. It loads ore from the muck pile, transports



TRACKLESS MINING gains in favor for hard ore. This electric powered loader teamed with electric driven shuttle car handles hard heavy abrasive iron ore at major mine.

## Underground Mining

it to the ore pass, and dumps. The larger of the two Atlas Copco models, the T4G, now in operation at Montevicchio, has an actual capacity of 2.14 cubic yards. The loading bucket cleans the floor and is powerful enough to penetrate well into the muck pile for each load. Traveling speed of the machine is 4½ feet per second. With a hauling distance of 72 feet between the muck pile and the ore pass, the machine loaded and dumped 54½ cubic yards per hour. This machine has allowed a greater spacing of ore passes, up to 328 feet. The model T2G, also going into use at Montevicchio, is a smaller version of the prototype with a one-cubic-yard hopper. It performs best where the floor is irregular.

**UNDERGROUND CONVEYORS:** Recent developments of Goodman rope belt conveyors have made these light-weight, economical installations more widely used underground. Their simple construction, with support from either the back or the floor, makes them a versatile addition to a mine gathering system. An installation is currently being designed and tested for the Tennessee Coal and Iron Company. This conveyor is to handle a maximum lump size of 20.5 inches. Belt speed will be 350 feet per minute and belt width 42 inches. Maximum lump weight will not exceed 1,000 pounds. The belt conveyor is to take the surge of a 13-ton shuttle car in a minute to a minute and a half discharge rate. Other installations of this type are at Cleveland-Cliffs Iron Company and at Steep Rock in Ontario. The development of an extensible belt conveyor for use behind a continuous miner is also of significance in underground materials handling. These units can be extended 100 feet without interrupting the flow of material.

Armored conveyors are now finding acceptance in hard rock mining. Units made by the Herold Manufacturing Company of Scranton, Pennsylvania, have been installed by Cleveland-Cliffs Iron Company and Steep Rock Iron Mines Limited. The armored conveyors are handling iron ore which weighs approximately 160 pounds per cubic foot when broken and the lumps range in size up to 3 feet. The ore is moist to wet and is

moderately abrasive. These chain type conveyors move the ore in a trough. A typical installation has a conveyor length of 250 feet and is powered with a 100-horsepower motor. It has a rated capacity of 200 tons per hour at an operating speed of 85 feet per minute. Most of these installations are used for moving cave rock from finger raises or from scrap drifts to cars. These units have been installed where slusher hoists and scrapers have normally worked in the past. The economical scraping distance in block caving installations is normally about 125 feet. The importance of the armored conveyor lies in the fact that they are practical at distances of 250 feet and provide a continuous flow of rock.

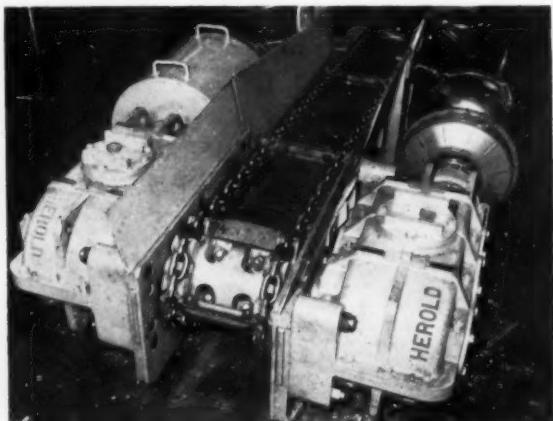
**VENTILATION:** Significant developments have been made by the Anaconda Company in the field of dust collection. A compact wet impinger type dust collector, known as the "Microdyne," was pioneered by the Anaconda Ventilation Department and is made by the Joy Manufacturing Company. The unit is made up of three double walled cylindrical sections with a fan mounted end-to-end so that the resultant configuration is a smooth cylinder. The first section is a cleaner section; it contains a water spray and an impingement screen assembly. The second section is a water eliminator section which is an axial type cyclone containing turning and straightening vanes. The third section is a transition section to accommodate the Joy axial flow fan. This dust collector is so small that it is often possible to mount the entire unit in the duct line. The dust laden air enters the collector at the cleaner section under suction from the fan. The air passes through the sprays and then through the cleaner section. The geometric configuration of the screen is such that there is no straight line path for the air to pass through. It must turn in order to pass through the screen. The dust impinges upon the fine wires of the screen due to its own inertia. At this point the water sprays perform a dual role. One is to wet the screen and catch the dust, and the other is to keep the screen flushed at all times to prevent clogging. As the water droplets leave the screen, due to the air flow, the effective mass of the dust particles is in-

creased many times since dust is encased within the droplets. The water droplets then enter the cyclonic separator and are thrown to the periphery of the collector because of the centrifugal force field generated within. Around the circumference of the water eliminator are many louvers through which the water passes and is subsequently drained into a water sump at the bottom of the water eliminator. The sump is provided with two discharge pipes, from which the resultant slurry can be drained or pumped away. The cleaned air passes from the water eliminator through the fan and out of the unit. The "Microdyne" is usually fabricated from stainless steel and has no moving parts except a standard axial-vane fan. The units range in capacity from 2,500 to 48,000 cu. ft. per minute.

At Nchanga Consolidated Copper Mines, Ltd. in the African Copper belt, two modern electrostatic air filters have recently been installed underground. One is installed on the 970 level, the more recent on the 1,500 level. About 50,000 cubic feet per minute of air is sucked through the new precipitator by a 50-inch diameter fan, which is driven by a 50-horsepower motor. The installation consists of three major parts—the ionizer, the dust collector cell, and the power pack. The ionizer comprises a number of grounded tubes between which are fine metal wires charged at about 13,000 volts dc. The high potential difference between the fine wire and the grounded tube surface causes a strong electrostatic field to be set up across this space. When a dust particle, carried by the air stream, passes through this space, it is met by a stream of ions traveling outward from the ionizing wire. It is immediately charged and is ready to be deposited on the collecting surface. The collector cell is a number of flat, parallel, vertical plates, one set of which is grounded, and the second set charged to about 6,000 volts. The charged dust particles pass through the plates and are driven to the grounded plate to which they stick until removed during cleaning operations. The plates are cleaned by a jet of water once a week and are dried by compressed air.



INCLINED SHAFT was mucked with this electric powered loader during sinking. The same machine was then used for ore loading in stopes.



ARMORED CONVEYORS are now used for moving iron ore to raises or cars from finger raises underneath block caved stopes.

# Open Pit Mining Takes Transportation

## Planning With Larger Machine Units

As open pits get larger and deeper the stripping ratio goes higher—for iron, copper, and other metals. Machinery companies and operators have done a spectacular job in building and using new and larger machines to make this possible.

New drills and new blasting agents produce the broken rock. From the muck pile it's a matter of transportation—big fast coordinated transportation—to complete the mining cycle. Here are current developments and trends:

**ROTARY DRILLING:** With the trend to fertilizer grade, free running, explosives, has come the demand for larger diameter blast holes and greater hole spacing. The result has been less footage of hole drilled and a concentration of explosive force at the hole bottom. Rotary drilling is rapidly replacing churn drilling as a means of boring blast holes, because of increases of two to four times the footage of hole per shift and the consequent reduction in drilling costs. Of basic importance is the rotary bit design and the quantity of compressed air provided to remove cuttings from the hole. A tremendous variety of bits adapted for all types of ground conditions, from soft to hard, are now available. These range from "drag" or "finger type" bits for use in soft formations to tungsten carbide "tri-cone" bits for hard formations. An important factor in bit life, is the removal of rock cuttings from the hole as large particles. To accomplish this, air velocities of 3,000 feet per minute are maintained between the drill stem and the side of the hole. Jet type tri-cone bits have been developed to improve the air cleaning action at the bottom of the hole.

In the past two years, the drilling industry has become increasingly aware of the possibilities inherent in having a "down the hole" source of power for driving the rotary drill bit. Tests for this method have been conducted since 1873, but only recently, with reported success with Russia's turbodrilling, has there been such widespread interest. The turbodrill has put down 5,400 to 5,600-foot deep wells in eight days, compared to 36 days for rotary mud drilling. Proper bit design is the major problem now, since turbodrills run from 500 to 600 revolutions per minute.

Large diameter holes have also been successfully drilled by rotary methods. A 75-inch-diameter shaft was drilled to a depth of 452.2 feet in 55 days. In one installation, 12 rolling cutters were installed around the periphery of a core barrel. The cutters were mounted on conventional tri-cone type bit bearings. These removed a four-inch kerf around the periphery of the 75-inch-diameter hole. After about five feet of a core has been drilled, the drilling machine is withdrawn from the hole and the core catcher is inserted. A small explosive charge is used to break off the core, then camming devices on the core catcher engage the large cylinder of rock and it is hoisted out of the hole. Other large hole drilling methods utilize pilot holes which are in turn enlarged by reaming to diameters up to 9.0 feet.

American Zinc Company of Tennessee is drilling a 66-inch-diameter ventilation shaft at its Young mine in Tennessee with a special Calyx type drill. See Sep-

tember 1957 MINING WORLD, pages 60 to 64. An advance of one foot per hour of drilling time at a total cost of \$100.00 per foot has been achieved. However, direct operating costs varied from only \$40.00 to \$50.00 per foot.

**BLASTING:** The most significant developments in blasting have occurred in the field of fertilizer grade ammonium nitrate. This product produces larger gas volume than any other explosive material commonly used, and is the cheapest explosive available to open-pit operators. The rate of detonation of pure ammonium nitrate varies from 6,600 to 11,900 feet per second. Smaller particle size, lower apparent density, greater confinement and higher efficiency of primer serve to increase speed, as do certain additives. The superiority of prilled ammonium nitrate is laid to fine particle size and porosity, which gives low density and which, because of its free running characteristics, gives good confinement. Diesel fuel is usually added in the 50- or 80-pound bags and allowed to stand for several hours in order to increase penetration of the oil. Six to eight percent, by weight, is usually added. In cases where there is difficulty in breaking bottom, higher density grained ammonium nitrate or ammonium nitrate dynamites are often used at the bottom of the hole. Proper detonation of prill-oil mix determines its effectiveness. High velocity primers with approximately 65 percent strength are required in order to get the maximum rate of detonation. With adequate detonation, velocities of prill-oil mix are reported to be approximately 15,000 feet per second. Several of the operators who have replaced nitro-carbo-nitrate explosives with prilled ammonium nitrate-Diesel oil have reported 40 percent savings in explosive cost. Many experiments are currently in progress to determine the minimum primer required. The primer size is a function of the hole diameter and the weight of the powder load. In some instances, 9-inch-diameter drill holes are being successfully detonated with primers weighing less than 1.0 percent of the powder load. Shots are usually fired with

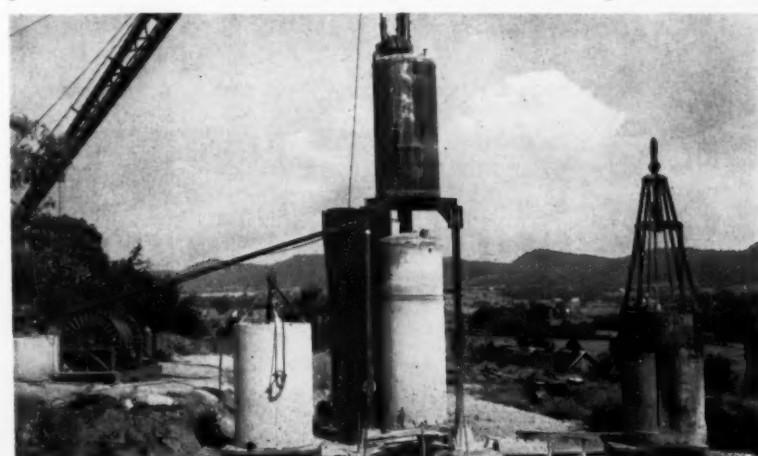
detonating fuse using millisecond delay connectors. Primers costing as little as \$0.70 apiece have been successfully used. Fertilizer-grade ammonium nitrate costs approximately \$80.00 per ton. The strength of prill-oil mixes, by weight, is comparable to about 50 percent dynamite.

At Kennecott Copper Corporation's Utah Division's Bingham pit, research has been conducted into the loading of horizontal "toe" holes with prill-oil mixtures. Depths of these holes vary from 24 to 28 feet and they are inclined slightly downward so that they bottom five feet below the bench level. Horizontal spacing of these holes averages 22 feet. These "toe holes" are drilled by 4-inch-drifter machines, mounted on self-contained mobile drill units using 3-inch starter bits and bottoming at a minimum of  $2\frac{1}{2}$  inches in diameter. These holes are sprung or chambered with Gelamite stick powder, having a 65 percent weight strength. Their research work has led to a completely mobile loading machine, a 4-wheel drive truck, equipped with 125-cubic-foot-per-minute rotary compressor, powder blowing machine, Diesel fuel tank, and hose reel. Two of these trucks are being used to blow prilled ammonium nitrate into the "toe holes." A metering device has been built into the blower unit to inject Diesel fuel into the hole in the proportion of 1.0 gallon per 100 pounds of ammonium nitrate. Kennecott has substituted commercial grade ammonium nitrate powder for conventional dynamites with 65 percent weight strength, on a pound for pound basis, resulting in a powder factor of about 10 tons of material broken per pound of powder used. Shots are being detonated with five pounds of 65 percent weight strength dynamite.

Of particular importance here is the mechanization of powder handling—the development of equipment to handle the powder in bulk and transport and load the powder with a single vehicle.

Further developments in the bulk handling of prilled ammonium nitrate are reported at the Geneva plant of the U.S. Steel Corporation, where trucks are being designed to transport the prills from the manufacturing plant directly to drill holes at the Corporation's iron ore mines in the Cedar City, Utah district.

The method of transportation used for



ROTARY DRILLING was used by American Zinc Company of Tennessee to sink its new 66-inch diameter air shaft at the Young mine. Cost was lower than by regular sinking methods.

## Open Pit Mining

the removal of ore and waste from open-pit mines falls naturally into four rather broad categories: rail haulage, truck haulage, conveyor haulage, and skip haulage. The categories are broad because frequently two or more transportation methods are used together. The choice of which method to install in a particular mine is quite naturally an economic one—that is, the method or combination of methods available at the lowest capital investment and the lowest operating cost consistent with good mining practices. In the design of any type of mine transportation system, a primary consideration is the maximum grades upon which the system can operate. With rail haulage, the maximum is 3.0 percent; with trucks, it is about 10; belt conveyors can be operated on grades up to 30; and the inclined skips are limited to only the slopes of the open-pit walls.

**CONVEYORS:** Pioneering in the application of belt conveyors to open-pit mining has been done in the Lake Superior iron district. In the last 25 years more than 400,000,000 tons of iron ore have been carried on conveyor belts. The mine operators of that district have contributed substantially to the techniques which are used today.

Conveyor belts have been constructed with capacities ranging from a few tons to 6,000 or more tons per hour per belt. Belt widths of 60 to 72 inches are common and speeds of 800 feet per minute are being used for some of these wide belts. With the new developments, greater capacities, and longer lifts, cheaper operational and maintenance costs are a certainty.

Robins Conveyors Ltd. of Johannesburg, Union of South Africa, is constructing a conveyor system, 8,000 feet long and 54 inches wide, at the Nchanga Consolidated Copper Mines, Ltd., in Northern Rhodesia. Gathering is done with 42-inch conveyors. The conveyor system will carry clay and soil that will be stripped from the surface of the open-pit mine to provide access to the copper ore. Material will be removed by two bucket wheel excavators that will cut benches at 86-foot intervals in the large pit. Belts will travel at 800 feet per minute, and will move about 50,000 cubic

yards per day. At the waste disposal site, a standard gauge railway parallels the conveyor belt so that a large track shifter can be used to move the belts when necessary. Engineers in South Africa have stated that this project will be the largest earth moving operation ever undertaken in Africa. It is expected that a mountain of waste containing 100,000,000 cubic yards will be accumulated in seven years of stripping.

In a West German brown coal mine near Cologne, a very large bucket wheel excavator is capable of loading 100,000 cubic meters per day into 100-cubic-meter railroad cars. This tremendous machine weighs 5,600 tons, yet it is readily moved on caterpillar tracks. The 51-foot-diameter digging wheel has 10 buckets of about five-yard capacity each.

In a brown coal mine in Schwandorf, Bavaria, a somewhat smaller bucket wheel excavator is employed in a 100 percent conveyorized mining operation. Both stripped material and coal are conveyed on the same belts at a speed of approximately 800 feet per minute. Stacker belts are run at almost 1,600 feet per minute to project the waste material as far as possible beyond the end of the belt. This is probably the first completely conveyorized pit operation in existence.

**SKIPHOISTING:** Several mining companies in the west are giving serious consideration to the use of skips in open pit mining. These units, first developed by National Iron Company, are designed to hoist a truck load of mine run rock up an inclined railway. Several Rockover skip installations have been made for use with 22-ton-capacity trucks. The installations are designed so that level or down hill truck hauls are made to the skip loading station in the pit bottom. In some installations intermediate skip loading stations are also used. At one installation, at Marmora, Ontario, a double-drum hoist driven by a 1,250-horsepower electric motor transfers ore from the pit up a 45° incline, skipway to the primary crusher. Skips normally operate in balance on inclines varying from 38° to 45°. Recently, the Lakeshore Engineering Company of Marquette, Michigan, has offered a bottom dump "jet incline" skip in sizes ranging up through 40 tons. One

proposed installation using 35 ton skips on a 1,200-foot haul at 45° has an estimated capacity of 8,750 tons per shift.

**TRANSPORTATION OF SOLIDS IN PIPELINES:** A significant pipeline project was initiated this past year. The American Gilsonite Company placed in operation its 6-inch-diameter pipeline which transports 700 tons per day of gilsonite ore. This solid hydrocarbon is pumped as a slurry containing about 35 percent gilsonite solids in water. The pipeline crosses rugged mountain terrain in western Colorado. It spans two canyons via suspension bridges and crosses an 8,500-foot-high mountain pass as it travels from Bonanza, Utah to Gilsonite, Colorado. Design and pilot plant work for this \$2,000,000 pipeline was done by the Colorado School of Mines Research Foundation Inc., Golden, Colorado.

At the El Salvador property of Andes Copper Mining Company, plans are being completed for a 6-inch pipeline which will transport a copper concentrate with a specific gravity of 5.0. This pipeline will carry the concentrate, as a slurry, for approximately 10 miles to a railroad loading station. Many other excellent examples of pipeline transportation of solids could be cited, such as phosphates in Florida and uranium-bearing gold tailing near Johannesburg.

This technology has also seen wide application in underground mining. Principally for introducing mill tailing for stope backfilling. Hydraulic backfilling presents a fast, inexpensive means of providing permanent ground support in an active stope. It is, therefore, a valuable tool with which the mining engineer can design stoping methods for the future. It permits opening up larger areas, since they will be open for only a fraction of the normal time and ground movement can be controlled with positive support. Rock bursts and subsidence can be prevented. Hydraulically placed sand fill provides a horizontal surface on which scrapers, railroads, track mounted equipment, and wheeled vehicles can be effectively operated. It, therefore, makes possible the use of larger, faster, heavier, rock moving equipment in underground operations. An outstanding Symposium on Hydraulic Backfilling will be presented at the Montana School of Mines in Butte on May 9 and 10, 1958.



BUCKET WHEEL EXCAVATORS were of growing interest to United States mining companies during 1957. This unit is in Germany.



SKIP HOISTS are now used at western copper mines. One system has been designed to hoist 8,750 tons per shift from deep pit.



## Mining World Presents . . . . . 1958 Blue Ribbon Equipment Awards

On the next few pages are the new or improved products marketed in 1957 which were judged to offer the most outstanding contributions to the technology of mining and metallurgy. Mining World's annual Blue Ribbon Equipment Awards are selected from hundreds of entries submitted by manufacturers throughout the world.

Judging is done by an impartial panel composed of leading authorities from all specialized branches of the industry. This year's panel convened at Denver in February. The panel, pictured above, includes from left to right:

**Stanley H. Dayton**, associate editor, Mining World.

**Dr. Paul Kerr**, Department of Geology, Columbia University, an authority on tungsten and uranium.

**George O. Argall, Jr.**, editor, Mining World.

**Richard Young**, vice president, American Zinc Lead & Smelting Company; wide experience in zinc and uranium metallurgy.

**Vernon L. Mattson**, manager mining & milling, Kerr-McGee Oil Industries, Inc.; expert in potash and phosphate metallurgy.

**Bertram D. Thomas**, president, Battelle Memorial Institute; scholar, scientist and administrator with patents in the mineral separation field.

**F. A. McGonigle**, vice president, Haile Mines, Inc.; world-wide background in flotation and mining.

**Robert Henderson**, resident manager, Climax Molybdenum Company; extensive underground experience.

**John P. Herndon**, mine superintendent, The Anaconda Company (Jackpile mine); unable to attend, entries were mailed to him. He has world-wide mining experience.

1958
 
BLUE RIBBON  
MINING AWARD

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To

for achievement in equipment development aiding the technological advancement of the mining industry.

AWARDED BY

**Mining World / World Mining**  
MILLER FREDERICK PUBLICATIONS



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**For further information on award items,  
use Reader Inquiry Card following page 224**



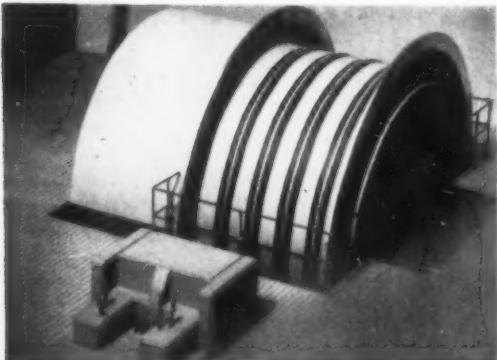
# Blue Ribbon Equipment Awards

## Underground



**Libu Side Tipping Bucket**

The Libu Bucket is the first side tipping bucket without end walls for use on Caterpillar Traxcavators. It can tip to the left, right, or forward. As a result minimum movement of the loader is required. Circle No. 1 on inquiry card.



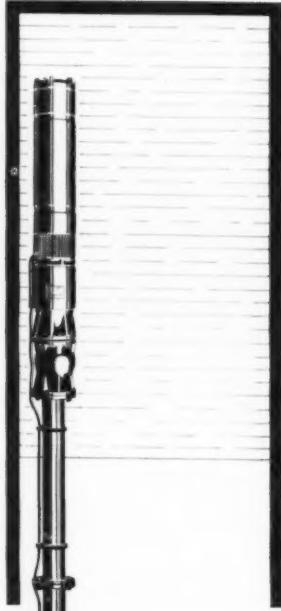
**Eisenhutte Prinz Rudolph Hoist**

The German EPR-design of the Koepe-pulley and drum feature by means of combination driving pulley and motor, and axial-acting block brakes a 30% saving in floor space, power, and weight reduction. Circle No. 2 on inquiry card.



**Wagner "Mole"**

Nicknamed the "Mole", this underground mucker has a 1½-yard bucket. All parts of this unit are lower than the top of the tires. The highly maneuverable "Mole" has a 4-wheel drive and 4-wheel positive hydraulic steering. Circle No. 5 on inquiry card.



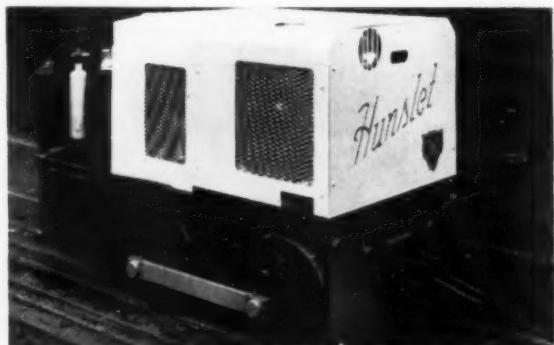
**Pleuger Pump**

Produced by Pleuger Unterwasserpumpen G.m.b.H. of West Germany, this submersible electric sump pump is designed to handle volumes up to 3,000 gpm, and heads to 1,300 feet. Motor is water filled and water lubricated. Circle No. 3 on inquiry card.



**C. S. Card Skip**

The Card Automatic Bottom Dump Skip features a skip body and frame in a unitized construction with excellent counterbalancing qualities. Overlapping and fast opening door can eliminate all spillage down shaft. Circle No. 4 on inquiry card.



**Hunslet Underground Locomotive**

The compact Hunslet Engine Co. "Tiger Tim" underground locomotive develops 23 hp at 1,500 rpm, with a water-cooled Diesel using a scrubber. Featuring a torque converter, the unit has a maximum tractive effort of 2,240 pounds. Circle No. 6 on inquiry card.

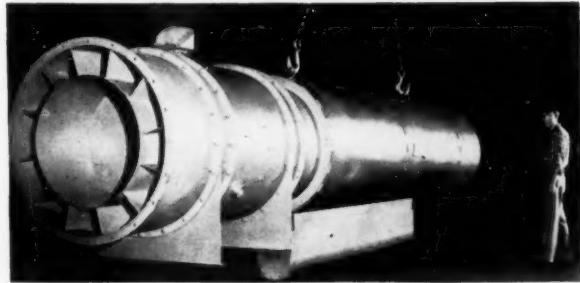
**MINING WORLD'S Awards For 1958**

# Blue Ribbon Equipment Awards



## CF&I Left-Hand Rock Bolts Threads

Ordinary stopers or sinkers on feed legs provide enough torque to tighten the new CF&I expansion type rock bolts. No special tools or equipment are needed except for a short shank with a socket end, to fit the drill. Circle No. 7 on card.



## Joy Microdyne Dust Collector

Described as 1/10 to 1/20 the size of comparable equipment, this Joy Microdyne dust collector is a wet, inertial type which is claimed to recover 99 percent of particles five microns in size or greater. Circle No. 8 on inquiry card.

## General Equipment & Supplies



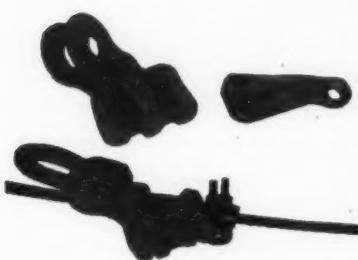
### August Thiele Conveyor

The August Thiele Steel Plate Conveyor, of German design and manufacture, is a rugged unit designed to convey ore or other heavy materials, on an incline or around curves having a minimum radius of five meters. Circle No. 9 on inquiry card.



### Staplex Air Sampler

The 10-pound Staplex HiVolume Air Sampler is used for accurately sampling large volumes of air for particulate matter by means of a filter paper. It is claimed to sample air containing particles down to 1/100 micron. Circle No. 10 on inquiry card.



### Sauerman Clamp

The Sauerman Continuous Cable Clamp is used to quickly attach a Dragscraper or other unit to load line. This fitting quickly attaches or removes a load from any place on a continuous cable. The clamp sizes are  $\frac{3}{8}$  to  $1\frac{1}{4}$  inches. Circle No. 11 on inquiry card.



### Harnischfeger Overhead Crane

An overhead traveling crane with 60 ton main hoist and two 20 ton auxiliary hoists has been developed by Harnischfeger. P&H says this is the first mill crane to offer stepless variable speed control with AC instead of DC power. Circle No. 12 on inquiry card.

## MINING WORLD'S Awards For 1958



# Blue Ribbon Equipment Awards

## Open Pit



### Reich Bros. Drill

Here's a light weight, self propelled air blast hole drill for drilling in hard rock. Using the "down-the-hole" principle of drilling, the unit drills 4-1/4 inch holes to approximately 300 foot depth. Circle No. 13 on inquiry card.



### Esco Dragline Bucket

Due to the design of the Electric Steel Foundry Company's Triple Tapered Dragline Bucket, faster loading, cleaner dumping, and longer bucket life is possible. All-welded construction is featured on the unit. Circle No. 14 on inquiry card.



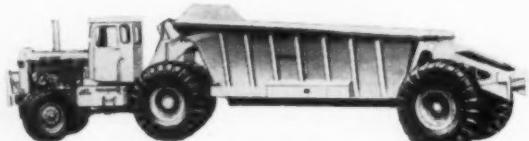
### Gardner-Denver Air-Trac

The Gardner-Denver Air-Trac is a self-propelled, self-contained unit, featuring centralized, hydraulic remote controls. Field tests in hard rock have shown the unit to average a drilling speed of 1.3 feet/minute of 2-1/4 inch hole. Circle No. 15 on inquiry card.



### Westfall Tractor

The Westfall "Performer" is a positive, four-wheel drive, pneumatic-tired tractor. The unit is powered by a 262 Cummins Diesel and has front wheel, full power steering. All 4 wheels have a locked momentum feature, preventing any wheel from spinning out. Circle No. 16 on inquiry card.



### Athey PW20 Bottom Dump Trailer

Design features of the new Athey Products Corporation 27-cubic-yard capacity bottom dump trailer, enable the unit to ride out over, not through, the dumped load, to make hauling and dumping easier. Called the PW20, the unit is designed to operate behind the Cat DW20 Tractor. Circle No. 17 on inquiry card.

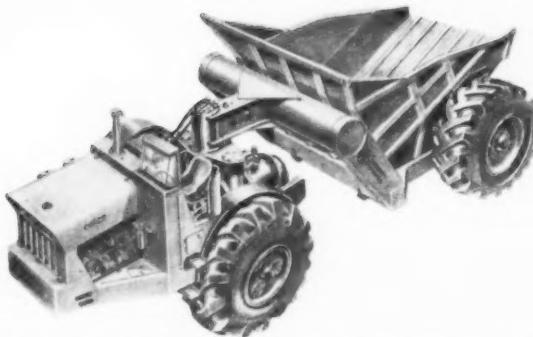


### Kenworth 803-B Haulage Unit

The Kenworth 803-B rear-dump semi unit, has a rated payload capacity of 64 tons or 40 cubic yards struck. Powered by a single 12-cylinder Diesel engine, the unit will be offered with either the 400 hp or 600 hp model of this engine. Circle No. 18 on inquiry card.

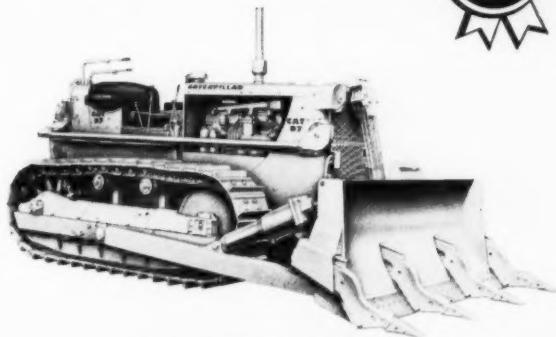
**MINING WORLD'S Awards For 1958**

# Blue Ribbon Equipment Awards



**Continental-Wooldridge Rear-Dump Unit**

The Continental-Wooldridge CWD-221 Rear-dump unit is capable of hauling a 35 ton payload at speeds up to 30 mph. Smooth operation and ease of control is assured by using a torque-converter drive. Circle No. 19 on inquiry card.



**Caterpillar Gyrodozer**

This Caterpillar Bulldozer blade with attached 23-inch ripping teeth, allows ground ahead of blade to be cut up, thus speeding up the bulldozing action. Hydraulic cylinders allow full control of tipping and tilting from cab. Circle No. 20 on inquiry card.

## Exploration



**Walker Bros. Hoist**

Here's a Diesel-electric portable hoist developed by Walker Bros., Ltd., in England. The unit is used for emergency hoisting and is capable of raising five tons from 3,000 ft. at a speed of 720 ft./min. Circle No. 22 on inquiry card.



**"Super Scout  
Diamond Drill"**

The 85 pound Super Scout drills to depths of over 60 feet and drills in any direction. A one-man unit, the rig consists of a drill, anchor column, and hand operated hydraulic feed cylinder which will deliver 1,000 psi on bit. Circle No. 21 on inquiry card.



**Boyles Bros. "Bazooka"**

Here is a lightweight diamond core drill manufactured by Boyles Bros. Ltd. The unit is ideal for mines where short hole testing to 100 ft. is required. Mounted on a bipod, it is held to the walls by an eye bolt assembly. Circle No. 23 on inquiry card.



**Varian's M-49 Magnetometer**

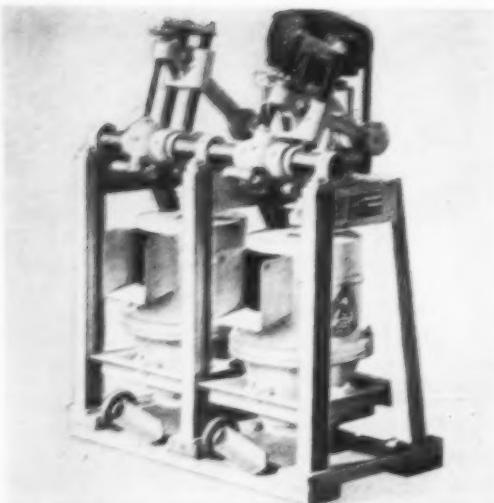
Varian Associates' M-49 portable Magnetometer is rugged and transistorized. Weighs less than 16 pounds and is accurate to 10 gammas. Reading is independent of the orientation of detecting device with respect to earth's magnetic field. Circle No. 24 on inquiry card.

## MINING WORLD'S Awards For 1958



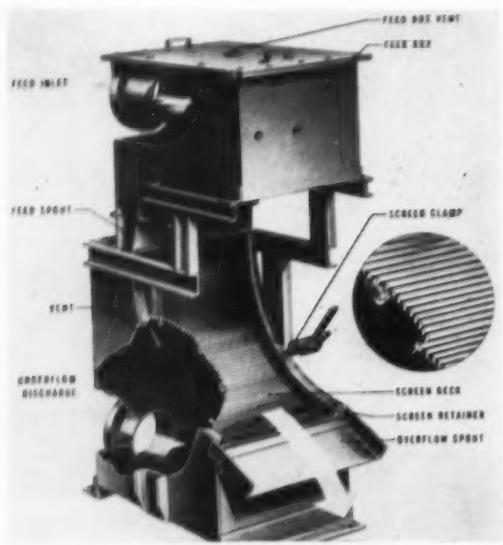
# Blue Ribbon Equipment Awards

## Ore Treatment



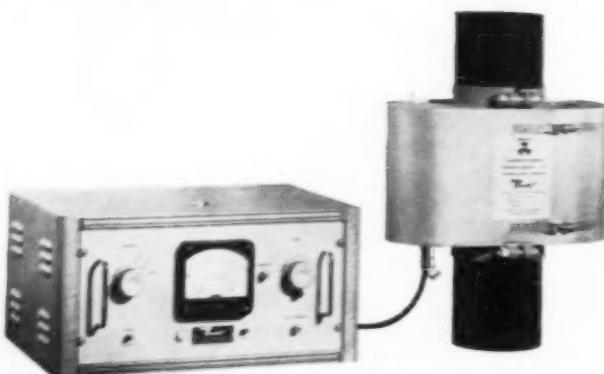
**Denver Adjustable Stroke  
Diaphragm Pump**

Developed by Denver Equipment Co., this pump has a longer stroke and up to 75% higher capacity as compared to conventional models. Adjustments can be made while pump is operating. Pumps are available to 1,000 gpm. Circle No. 25 on inquiry card.



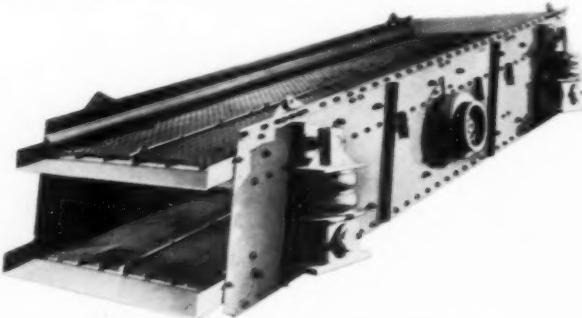
**Dorr-Oliver DSM Screen**

The Dorr-Oliver DSM Screen is a high capacity stationary screen for separations in the 8 to 100 mesh range. Wedge bars on screen surface separate at size about one half the spacing between bars. Circle No. 27 on inquiry card.



**Bendix Nuclear Density Gage**

The Bendix Aviation Corporation Nuclear Density Gage measures and controls density, specific gravity, concentration and or percent solids of slurry systems. Slurry is measured in pipeline, without the sensing head coming into contact with solution. Circle No. 26 on inquiry card.

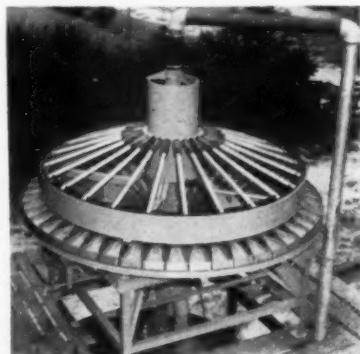


**A-C Air Spring Suspension for  
Vibrating Screens**

Developed by Allis-Chalmers Manufacturing Co., the springs provide 98 to 99 percent vibration isolation, depending on the air pressure used. The air springs make it possible to adjust to weight differences by altering the air pressure in the springs. Circle No. 28 on inquiry card.

**Cannon  
Circular  
Concentrator**

Developed by the Cannon Concentrator Co., this unit has no moving parts and uses specific gravity to effect a separation. The unit is said to work best on slurries of high density. Circle No. 29 on inquiry card.



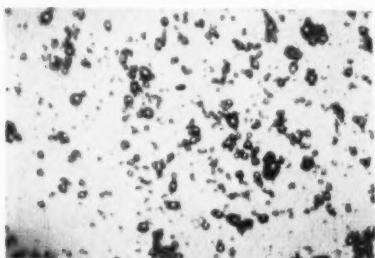
**MINING WORLD'S Awards For 1958**

# Blue Ribbon Equipment Awards



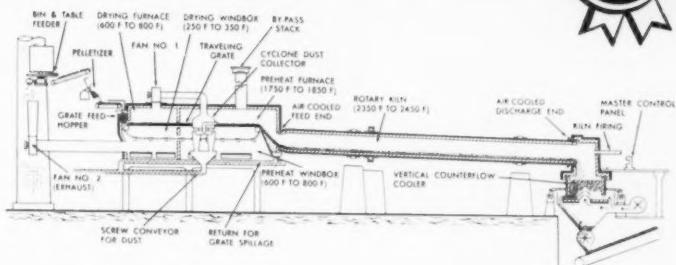
## A-C Process and Equipment for Treating Iron Ore Concentrates

Here's a new process and equipment developed by Allis-Chalmers Manufacturing Co., to pelletize and heat treat magnetic concentrates, to produce hard, durable pellets for blast furnace feed. Circle No. 30 on reader inquiry card.



### Knapsack-Griesheim Ferrosilicon

"Ferrosilicon 15% Atomized" has been developed by Knapsack-Griesheim. This spherical shaped media has many advantages over conventional angular media. Circle No. 32 on inquiry card.



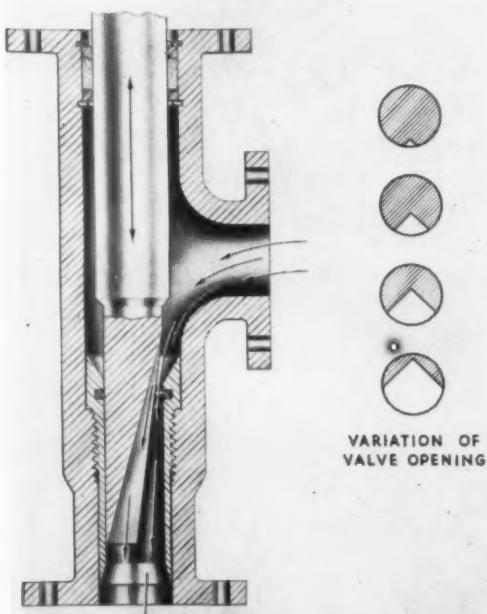
### Telluride Mobile Tailings Disposal Unit

Here is a mobile unit consisting of a series of Telluride Iron Works Cone Classifiers, that are truck mounted. As tailing pond builds up from processed tailing, unit may be easily moved. Circle No. 31 on inquiry card.

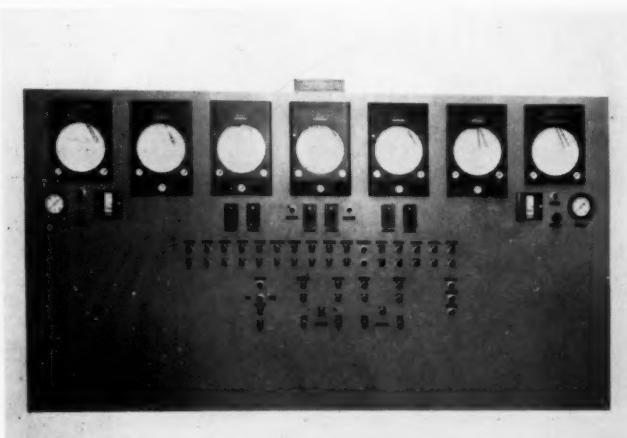


## Control & Laboratory Equipment

### General American Tapered Orifice Valve



The General American Valve Co., has utilized a new concept of flow control, in developing the Tapered Orifice Valve. The valve is designed to give infinitely variable control to the movement of slurries through an orifice without any clogging taking place. Circle No. 33 on inquiry card.



### Industrial Physics & Electronics Control System

Here is a control panel for a grinding circuit of a large ore concentration plant. Grinding circuit control is automatic. All circuit adjustments are made on this panel. Industrial Physics & Electronics have developed this integrated system to operate an entire mill. Circle No. 34 on inquiry card.

## MINING WORLD'S Awards For 1958



# SMIDTH

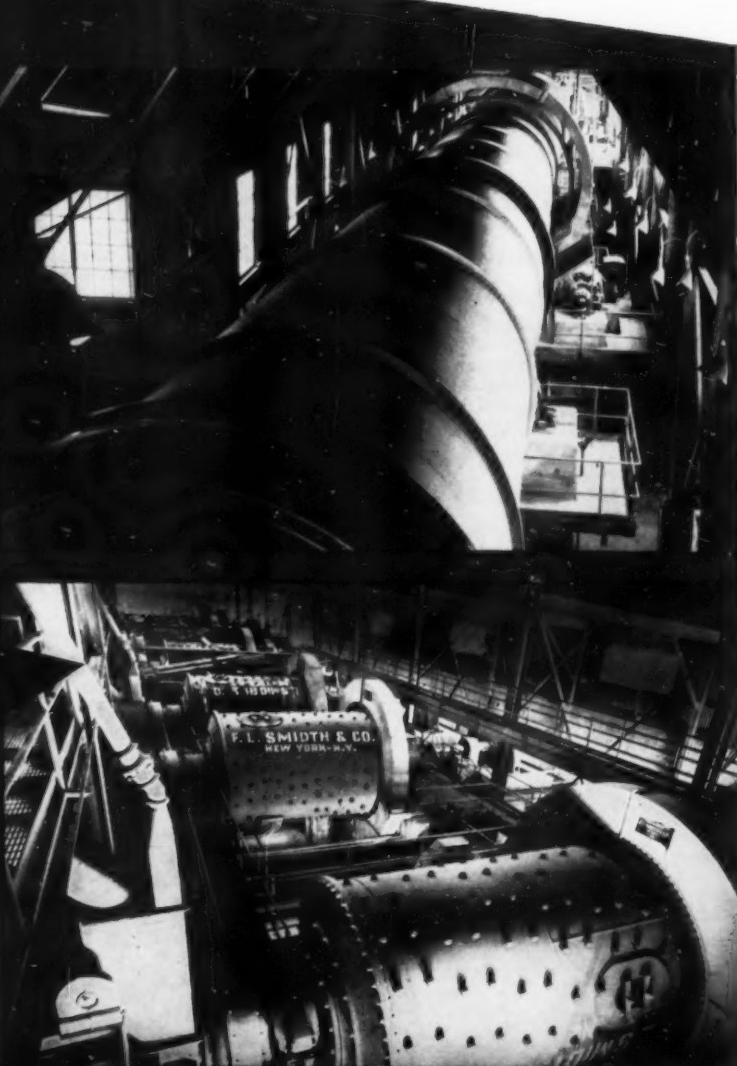
## Rotary Kilns

For sintering,  
nodulizing, calcining,  
desulphurizing,  
oxidizing and  
reducing—roasting—  
coolers, precoolers, pre-  
heaters, recuperators—  
and auxiliary equipment.

## Grinding Mills

Ball mills, tube  
mills and multicom-  
partment mills—open  
or closed circuit—wet or  
dry grinding also airswep<sup>t</sup>  
for grinding and drying.

Over 1,000 Smidth Rotary Kilns  
and over 5,000 Grinding Mills  
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# REVIEW & FORECAST OF Metals and Minerals

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## ALUMINUM

**"New applications are expected to raise aluminum use in a new home from 30 to 1,000 pounds"**



LAWRENCE LITCHFIELD, JR.  
Vice President and General  
Manager Mining Division,  
Aluminum Company of  
America, Pittsburgh, Pennsylvania

The principal happening in the aluminum industry during the past year was the definite ending of the post-war era of shortages. This ending occurred not because of any sharp decline in the use of aluminum, but because of the great increase in its supply. The supply has become so much greater that it has permitted an increase in consumption over 1950 amounting to at least 60 percent. All indications are that the available supply of metal will be more than adequate to fulfill the anticipated demand throughout the year 1958.

Metal demand and supply is reflected in bauxite and alumina production. Total domestic bauxite production for the first three quarters of 1957 was 16 percent below the same period the previous year; however, imports for consumption during the like period reached 5,032,332 tons, a new nine-month high. Third quarter imports, 1,982,000 tons, reached a new quarter high, largely attributable to acquisitions for the national stockpile and for private stocks for new alumina plants.

Last year saw the first imported bauxite from Haiti, which amounted to 4.8 percent for the first three quarters. Other percentages for the same period were: Jamaica, 48.4 percent; Surinam, 40.5 percent; British Guiana, 5.8 percent; others, 0.5 percent.

Continuing to seek new areas of bauxite, aluminum producers are conducting exploration in Hawaii, Panama, and Costa Rica, and are even going as far afield as Australia and Africa to find mining concessions. In fact, Reynolds Metal Company, and Aluminum, Ltd., have formed subsidiaries to prospect and develop concessions and leases in Australia.

Harvey Aluminum Company was granted a license to prospect for bauxite in Jamaica. If that company begins mining operations there, it will join Aluminum, Ltd., Kaiser Aluminum Company, and Reynolds Metal Company. Harvey has also arranged to purchase Japanese alumina to be shipped to its new smelter on the Columbia River, near Portland, Oregon.

Aluminum Company of America and Kaiser have signed contracts for bauxite exploration and production in Panama.

Alcoa is continuing construction work preparatory to initiating bauxite mining operations in the Dominican Republic.

We are very optimistic about the longer-term outlook because unit consumption of aluminum has increased in many of its big markets, such as automobile, residential construction, and home appliances.

The present surplus of metal is actually a healthy sign. It means that many more designers and fabricators, confident of the availability of aluminum, will now feel free to capitalize on the natural advantages of the lightweight metal.

This new confidence already is being reflected in important market areas.

For instance, look at residential building. Intensive development of new applications and distribution methods is expected to raise aluminum usage in the average new home from about 30 pounds today to 1,000 pounds by 1965. Home remodeling will consume much additional tonnage.

Applications of aluminum in the non-residential building field are progressing steadily; a great new market is in the highway construction field, where the industry has advanced such aluminum applications as maintenance-free lighting standards, bridge railing, signs, and chain-link fencing.

Packaging and containers are another fast-growing market area, and the industry is doing more and more in the way of research and development in this field.

A number of significant technological advancements were announced last year. One was a new aluminum-lithium alloy, marking a major break through the thermal barrier for applications of aluminum in supersonic aircraft. Also announced, was the commercial availability of aluminum powder metallurgy products, aluminum asphalt paints, aluminum sheet in extra wide widths and unprecedented flatness, an improved extruded aluminum flooring system for highway trucks and trailers, and high-strength nonheat-treatable alloys with excellent welding characteristics.

Avenues for further applications of aluminum were opened with the introduction of new high-temperature soldering materials and foamed-plastic insulated panels for the building, refrigeration, and other industries.

Despite the rapid progress already achieved in the aluminum industry, we are confident that our favorite metal is headed for an increasingly important position in the nation's future economy.

## ANTIMONY

**"Indicates large potential uses for these compounds in many new types of electronic devices"**



JAMES P. BRADLEY  
Vice president, Bradley  
Mining Co., San Francisco,  
California

Except for the small byproduct output of antimony from the silver-lead ores of the Sunshine Mining Company in Idaho, the domestic antimony mining industry is practically non-existent. There are many known antimony deposits in the western United States, but domestic miners are unable to compete with low-cost antimony imports due to inadequate tariff protection.

Bolivia, Europe, Mexico, and South Africa supply the bulk of United States requirements for primary antimony and

about two-thirds of our antimony imports are from overseas sources.

Governmental and industrial sponsored research on the antimony semiconductor compounds (aluminum-antimony and indium-antimony) is continuing and indicates large potential uses for these compounds in many new types of electronic devices.

### United States Primary Antimony Production, Consumption, and Imports in Short Tons of Contained Antimony in 1955, 1956, and 1957

Item	1955	1956	1957*
Domestic mine production	630	590	650
General imports	12,000	12,500	16,200
Consumption	12,000	12,900	10,400

\* Estimated.

## ASBESTOS



KARL V. LINDELL  
Vice President, Canadian  
Johns-Manville Company,  
Ltd., General Manager,  
Johns-Manville's Asbestos  
Fibre Division, Asbestos,  
Quebec

There is a considerable time lag in obtaining world statistics on asbestos fiber, but preliminary figures indicate that total production in 1957 may have reached almost 1,800,000 tons, an all-time record.

Canada, the largest producer, maintained its ratio of slightly more than 60 percent of the world market or almost 1,100,000 tons with an estimated value in excess of \$100,000,000. When the final figures are reported, Canadian production may have set a record in 1957 in tonnage of fiber shipped and in dollar sales volume. In 1956 Canadian fiber shipments amounted to 1,014,249 tons valued at \$99,859,969. Canada's previous record year was 1955 when 1,063,802 tons were shipped with a value of \$96,191,317.

About 97 percent of Canadian fiber is exported. Canada itself is able to absorb only a small part of total production and exports are of vital importance to the industry and to the Canadian economy. Economically, expansion of Canadian facilities for manufacturing asbestos products is not feasible because of the greater cost involved in shipping the other materials used in conjunction with asbestos fibers. As the Canadian market is able to absorb Canadian-made asbestos products, facilities are being made available.

The United States is Canada's largest customer using about 60 percent of Canada's exports. Western Europe—France, West Germany and Italy—was Canada's second best market in 1957, followed by Japan, South America, and Australia.

Southern Rhodesia was second to Canada in production with an estimated 299,000 tons followed by the United States, 50,000 tons; Western Europe, 48,000 tons; Australia, 14,000 tons and Russia, 260,000 tons. The latter figure is a Canadian government estimate. It is possible that Russian production may

### "There have been developed more than 3,000 uses for this versatile fiber"

be substantially higher. Russia's output, of course, can only be very roughly estimated. However, it is known that Russia has a fairly extensive domestic market and has been exporting substantial quantities of asbestos fiber to Western Europe, thereby offering greater competition to Canadian and Southern Rhodesian fiber.

Nevertheless, the dominant note among Canadian asbestos producers is one of optimism for the future. This is best exemplified by the industry's expansion in recent years. This expansion will be virtually completed in 1958 and will represent an expenditure of about \$100,000,000.

Most of this expansion has taken and is taking place in Canada's eastern Townships—the Asbestos-Thetford Mines area—which produces about 65 percent of the Free World's asbestos. British Columbia and northern Ontario are Canada's other asbestos producing regions.

Expansion programs and new developments throughout the Canadian industry are expected to increase Canada's production capacity by about 200,000 tons. It is estimated that employment in Canadian industry will increase from about 7,000 to 7,500 before the end of 1958.

Exploration for new sources continued during 1957. There are promising prospects in Newfoundland, northern British Columbia, and the Yukon territory.

As a result of constant and intensive research by the asbestos industry over the years, there have been developed more than 3,000 uses for this versatile fiber for the home, industry, and defense needs. For example, there was an increase in demand for the lower and cheaper grades, known as "shorts." These fibers are widely used in products requiring a fibrous filler such as floor tile, plastics, and certain types of paints.

At present it appears that demand for Canadian fiber will probably be the same in 1958 or may slightly exceed that of 1957. But the industry's expansion program will put it in a sound position to meet the anticipated increased demand in the years following 1958. This demand is expected to reach 1,450,000 tons a year in 1960, and 1,600,000 tons by 1965.

The long range future for the asbestos industry is most promising.

## BERYLLIUM

### "When some of potential uses materialize it will be important to open new sources of beryllium ore"



D. H. HERSHBERGER  
Treasurer, Brush Beryllium  
Company, Cleveland, Ohio

The year 1957 was one of transition for the beryllium industry. Through last year, the greater part of the annual consumption of beryl was used to make beryllium copper alloys. Construction of two new plants was completed for the purpose of making pure beryllium metal. Their production is expected to consume 4,000 tons of beryl per year beginning in 1958, compared with the maximum total of 3,800 tons which previously have been consumed for beryllium alloys and compounds, and as ground ore in ceramic applications. It is expected that this new rate of consumption will tend to increase because of the increasing attention now given to the unique physical properties of beryllium.

There has been a substantial increase in research and development expenditure due to the widening interest on the part of designers. The United States Air Force awarded a production development contract for rolling beryllium into sheet. Other research and development projects are directed toward other fabricating techniques. Any measure of success in these efforts should result in additional uses of the pure metal.

During last year, the first commercial orders for beryllium parts in atomic testing reactors were received in competition

#### United States Receipts of Beryl in Short Tons by Countries of Origin for 1952, 1953, 1954, 1955, 1956, and 1957<sup>1</sup>

Country of Origin	1952	1953	1954	1955	1956	1957 <sup>1</sup>
Afghanistan	0	0	11	0	0	0
Argentina	550	1,495	0	441	2,330	1,544
Belgian Congo	0	0	11	128	992	222
Brazil	2,590	2,614	1,828	1,735	2,607	2,165
British East Africa	18	22	23	84	264	56
British Somaliland	0	0	0	9	29	0
British West Africa	0	0	0	0	22	0
Morocco	118	23	0	0	26	0
Hong Kong	0	0	0	0	1	0
India	196	199	392	845	3,360	1,256
Republic of Korea	3	8	4	6	0	0
Madagascar	0	330	77	28	212	43
Mozambique	308	392	1,295	620	1,110	965
Nigeria	0	0	0	3	0	0
Pakistan	0	0	0	0	15	69
Portugal	105	332	338	285	242	33
Rhodesia & Nyasaland	931	1,296	957	861	559	266
Surinam	0	0	10	0	0	0
Sweden	0	0	5	0	0	0
Union of South Africa	1,153	1,323	865	994	602	670
United States of America	515	751	669	500	460	575
TOTALS	6,490	8,749	6,485	6,537	12,831	7,864

<sup>1</sup> Preliminary

with testing reactor designs based upon the use of graphite, light, and heavy water. Beryllium parts of inertial guidance systems were successfully tested, resulting in the first commercial production orders for beryllium gyroscope parts. The experimental use of beryllium in various missile applications further advanced the possible use of beryllium in operational missiles and high speed aircraft. Renewed interest in beryllium oxide was evidenced by inquiries for fabricated beryllia refractory parts. References have been made to the high value of beryllium as a solid fuel for rockets and missiles. The possible use of beryllium for this purpose is being studied.

It is quite apparent that while the national consumption of beryl remains below 10,000 tons per year, the supplies of hand-cobbled beryl will readily suffice. The possibility that additional quantities of beryl will be required has increased interest in the milling of beryl concentrates in the United States. Several reports of such mill construction have been received but, to this time, no samples of a beryl concentrate have been forthcoming. Meanwhile, some of the world production of beryl is

being purchased in Europe, evidently for stockpiling purposes. According to preliminary figures the industry in the United States imported about 7,000 tons in 1957. This, together with the estimated domestic production of 575 tons, exceeds the consumption in 1957 which is estimated at 5,000 tons (4,431 tons for 1956).

It seems likely that the new supply of beryl to the United States in 1958 will be about the same as it was last year, or about 7,500 tons, and that the consumption will also be about 7,500 tons. This balance between supply and demand is based upon present orders and contracts. When some of potential uses materialize, it will be important to open new sources of beryllium ore. Such new sources can be the extensive low-grade deposits known to exist in this country, and the many pegmatites here and in Canada that are not worked because of the high costs resulting from hand sorting and cobbing. Investigations are under way to develop milling and the beneficiation of beryl so that adequate supplies of beryl concentrates will be available at reasonable prices.



STANLEY H. DAYTON  
Associate Editor  
Mining World

Expansion-minded borax producers took a breather in 1957. Production leveled off at about 2 percent below the output of 1956. Consumption was down, too, but only slightly. Most news centered around the application of boron in high energy fuels; in fact, this topic has become a favorite for discussion in the financial canyons of New York, Chicago, and San Francisco. But the impact of fuel research and development on the future of boron can't yet be predicted accurately.

Three producers, all located in Southern California, accounted for about 95 percent of the world supply of borax. United States Borax & Chemical Corporation completed conversion of mining facilities from underground to open pit. In November the company dedicated a new \$18,000,000 refinery adjacent to the open pit. The open pit replaces underground production of ore using continuous miners, shuttlecars, and belt-conveyor haulage to the shaft. The open pit ore is drilled with Diesel-powered, 4½-inch augers; blasted with Diesel-soaked ammonium nitrate; loaded with electrically powered shovels; and trucked in 22- to 24-ton loads to the plant located 0.8 miles from the bottom of the open pit. (See June 1957 and March 1958 MINING WORLD.)

Certain components of U. S. Borax's new refinery were over-designed so that additional capacity could be obtained with a minimum of time and expense.

Production continued on a normal scale during 1957 at American Potash & Chemical Corporation and Stauffer Chemical Company operations at Searles Lake in California. Borax is recovered from the brines treated by plants of these two companies. The estimated  $\text{BaO}_2$  content of 1957 production from the three Southern California producers was 308,000 tons. Crude production was estimated at 980,000 tons for the year. A fourth firm, California Borate Company, has developed reserves adjacent to U. S. Borax, but plans for production are unknown.

Major exploration programs in the Kramer district were carried on last year. Perhaps most significant, was the announcement that 40,000,000 tons of low-grade colemanite (calcium borate) had been outlined in an area about 10 miles east of Boron, California. The deposit is located on land controlled by Kern County Land Company. The reserves were indicated on the basis of 17 drill holes. Depth to the newly disclosed colemanite body is estimated to be about 1,000 feet.

Kerr-McGee Oil Industries Inc. also is undertaking a full-scale exploration program in the Mojave Desert near Boron. Kerr-McGee has leased more than 14,000 acres of land from Southern Pacific Land Company for a 25-year period and has the rights to all saline minerals discovered, including potassium, sodium, boron, and lithium.

Though consumption of borax was off a bit in 1957, this trend is not expected to continue. Demand for the raw ma-

## BORON

### *"Most news centered around the application of boron in the high energy fuel field"*

terial furnished by producers has more than doubled in the past decade. Together, the glass and ceramics industries accounted for nearly half of the consumption of borax last year. Boron and boron compounds are being used in increasing amounts in fertilizers. Borax has long been used in cleansing agents. Glass, glass fibers, porcelain enamels, fertilizers, and cleansing agents, lumped together, accounted for about 75 percent of the 1957 use of borax.

The potential use of boron in fuels revolves around its high heat of combustion (about 25,000 Btu per pound). By way of comparison carbon releases about 13,000 Btu per pound. Boron also has the ability to lock hydrogen in solid or liquid form, and, next to lithium, is the lightest known substance which can be attached to hydrogen. Diborane  $\text{B}_2\text{H}_6$  releases 16,000 calories per gram during combustion.

During 1957 Olin Mathieson Chemical Corporation dedicated a new plant near Buffalo, New York, for production of high energy fuels containing boron. Olin Mathieson spokesmen say that within 10 years high energy fuels may become a \$1,000,000,000 industry. Callery Chemical Company has a contract with the United States Navy to produce exotic fuel, containing boron, from a plant at Muskogee, Oklahoma. Metal Hydrides Inc. was awarded a \$9,200,000 government contract in 1957 to produce sodium borohydride (used in making high energy fuels). Delivery of the chemical under the contract started in the final quarter of the year. The contract with Metal Hydrides was the second with the government for this firm in the high-energy fuel field.

In nuclear energy boron is interesting because of its ability to absorb neutrons. Boron-oxygen-carbon compounds have also received a great deal of attention recently. In these compounds, boron is linked directly with oxygen. A wide range of products have appeared in the past 2 or 3 years. They have been investigated as possible ingredients in insecticides, fungicides, pharmaceuticals, hydraulic fluids, stabilizers in plastics, and in paints and enamels.

#### United States Production, Exports, and Apparent Consumption of Boron Compounds in Short Tons from 1949 through 1957

Year	Sold or Used by Producers <sup>3</sup>			Apparent Consumption <sup>4</sup>
	Gross Weight	BaO Content	Exports <sup>2</sup>	
1949	467,592	139,200	109,491	358,101
1950	647,735	191,000	142,580	505,167
1951	862,797	241,000	213,445	649,353
1952	583,828	169,199	103,292	480,536
1953	715,228	213,300	139,317	575,911
1954	790,449	230,500	205,614	584,835
1955	924,496	293,165	222,828	701,668
1956	998,000	315,047	245,000 <sup>a</sup>	753,000 <sup>a</sup>
1957	980,000 <sup>a</sup>	308,000 <sup>a</sup>	240,000 <sup>a</sup>	740,000 <sup>a</sup>

1. U. S. Bureau of Mines. 2. U. S. Bureau of Census Report No. FT-410.

3. Quantity sold or used by Producers less exports.

4. Estimated.

## CHROMITE



### "There were recurring reports that Russian chrome was to be shipped into the United States"

F. W. LIBBEY  
Consulting Mining Engineer,  
Portland, Oregon

The long-awaited Long-Range Minerals Program of the Department of the Interior finally reached Congress in 1957 as S. 2375. Hearings on the bill were held during the summer by a subcommittee of the Senate Committee on Interior and Insular Affairs. Part of Secretary Seaton's statement to the committee referring to proposals for payment of production bonuses reads as follows:

*"The basically short world supply, coupled with the strategic nature of three of these minerals—namely, beryl, columbium-tantalum, and chromite—as well as the heavy dependence of the United States on distant overseas sources of supply underscore the desirability of making every effort to develop and maintain some production of these commodities from domestic sources."*

The chrome miners agreed entirely with this statement as it is the essence of what they have been saying for years. However, when they found out that the so-called bonus for chrome was \$21.00 a long ton for 46 percent Cr<sub>2</sub>O<sub>3</sub> ore, their hopes dropped with a thud. This pseudo bonus would hardly pay the freight to eastern markets where the domestic producer would have to compete with foreign chrome mined with cheap labor and, in part at least, subsidized by the United States government. If it really was the intent to make "every effort (sic) to develop and maintain some production . . . from domestic sources" certainly somebody "goofed". Of course "some production" is sufficiently vague to mean almost anything.

The U. S. Bureau of Mines reports that for the first 10 months of 1957 imports amounted to 1,955,027 short tons and consumption was 1,496,683 short tons. These figures indicate that prorated for the 12 month period imports were approximately 2,346,000 short tons compared to 2,175,058 in 1956, and consumption 1,796,000 short tons compared to 1,846,600 in 1956, although consumption was probably off in the last two months of the year because of drop in steel consumption.

Although shipments of Alaska chrome decreased in 1957 because of road washouts, production increased. The Kenai Chrome Company stockpiled 5,000 short tons for beneficiating at the company's 50-ton per day mill which stepped up activity to three shifts a day early in 1958. Sourdough Mining Company, Seldovia, shipped a small quantity of chrome to the government stockpile.

As reported by the California State Division of Mines, chromite production in California increased more than 19 percent compared to 1956. Two new concentrating mills were started, one at South Elder Creek in Tehama County and the other at Scotts Bar in Siskiyou County. Concentrates accounted for more than 75 per cent of total production of the state.

The American Chrome Company, Mouat, Montana, appears to have more than passed the halfway mark in its special contract with GSA to produce 900,000 short tons by December 31, 1961. Reportedly, research has shown that a saleable ferro-chrome running 50 to 55 percent chromium, 8.5 percent carbon, and 6 percent silicon, can be made from Mouat concentrates of about 38.5 percent Cr<sub>2</sub>O<sub>3</sub> and 1.6 to 1 chrome-iron ratio. The company recently announced a pilot plant for ferrochrome will be built at the mine.

In Oregon, W. S. Robertson stopped diamond drilling at the Oregon Chrome mine, the state's largest chrome producer, and the crew was reduced to six men. Ore in sight will be cleaned up and the mine shut down. In the John Day district of Grant County a few mines shipped to the Grants Pass, Oregon purchase depot as in 1956.

The Oregon Department of Geology and Mineral Industries continued its studies of structure of chrome ore bodies and a bulletin on the subject will be published in 1958.

No chromite production in Washington was reported for 1957. In the Twin Sisters chromite area, the Northwest Olivine Company is crushing olivine and shipping the product for refractory purposes.

The U. S. Bureau of Mines reported that at the end of September 1957 receipts of ore and concentrates at the Grants Pass depot totaled 158,667 long tons, leaving 41,333 long tons to be purchased under the GSA program. During January 1958 there was a speedup of receipts of concentrates from southern California. On February 12, 1958, the GSA office in San Francisco, California issued a release notifying chrome shippers that, as of February 7, the balance to be purchased at Grants Pass was 10,562 long dry tons, and the balance under the Carload Program was 6,130 long dry tons, making a total of 16,692 long dry tons to be purchased on that date. It surprised many Oregon people interested in chrome production to learn that a definite quota for the Carload Program had been previously set up. As of February 14, GSA reported that the balance to be purchased at Grants Pass was 9,919 L.D.T. and the balance under the Carload Program 5,711 L.D.T., or a total of 15,630 L.D.T.

#### Production of Chromite by States in 1956-1957

State	1956		1957 (Preliminary Estimate)	
	Short Tons	Value	Short Tons	Value
Alaska (1)	7,193	\$ 711,481	4,200	\$ 427,000
California (2)	27,082	2,191,956	32,000	2,592,000
Montana (1)(3)	118,780	3,806,926	119,371	3,819,872
Oregon (1) (4)	54,577	2,001,083	7,800	676,800
Washington (1)	30	3,330	—	—
TOTAL	207,662	\$8,714,776	163,371	\$7,509,672

(1) Statistics by the U. S. Bureau of Mines. (2) Statistics by the California Division of Mines. (3) Concentrates sold to GSA under special contract. (4) Includes approximately 45,700 short tons of ore and concentrates mined and stockpiled during World War II. Shipments to the Grants Pass depot during 1956 totaled approximately 8,850 short tons.

## COBALT

### "The reserves of cobalt are sufficient to warrant production at present rate for 80 years"

L. N. ROLLER  
Metallurgist, Centre d'Information du Cobalt, Brussels, Belgium

The technical future of cobalt seems to lie more than ever in

the high temperature alloy field. Expansion of cobalt alloys is expected in uses where thermal shock, hot wear, hot hardness, and non-galling properties are required.

A 65 percent cobalt alloy for steam turbine blades has been developed by the Westinghouse Research Laboratories. Utica Drop Forge and Tool Company presented a new cobalt-base alloy produced by vacuum melting. General Elec-

alloy produced by vacuum melting. General Electric's Jetalloy 1570 is used for power generation in gas turbines at 1,570° F. Another cobalt-base alloy can be improved by a boron addition in order to be used up to 1,800° F.

New cobalt-base alloys are being developed in France and England, while the different grades of Stellites show their outstanding qualities in a great number of countries and applications. Weld-depositing of stellite for hardfacing applications gains more importance as the processing techniques are developed.

In the magnet field the use of Alnico alloys is steadily extending. In the next years a stiff competition to Alnico 5 may be presented by a new fine particle iron material, but it will probably be superseded by a fine particle 40 percent cobalt alloy that is at present being investigated.

A big stimulus for an increased use of cobalt is the actual trend towards higher quality metal. Both electrolytical and thermal refining methods have been improved by the cobalt producers in order to reduce impurity contents (such as carbon and sulphur.) On the other hand, the mechanical properties of a number of cobalt alloys have been greatly improved by using vacuum melting techniques.

The price of cobalt, which had fallen to \$2.35 in 1956, was again reduced to \$2.00 per pound on February 1, 1957.

This price drop, which is due to technological progress resulting in a decrease of manufacturing costs, has been greatly favored by the soundness of the market, where an abundant supply of cobalt is now available for civilian uses.

It is expected that much money will be spent for research on cobalt in the next years. The bulk of the work, including some important fundamental research, is being carried out by the Cobalt Information Center. This organization, which was created in Brussels, Belgium, in early 1957, has its main offices in Brussels and its United States offices within the Battelle Memorial Institute at Columbus, Ohio. In addition, United States government agencies sponsored more than 150 studies on cobalt alloys, mainly for aircraft applications.

Most of the world's cobalt supply is a coproduct from the processing of copper-cobalt and nickel-cobalt ores. As the

**Free World Cobalt Production, By Countries, in Short Tons of Contained Cobalt in 1950, 1955, 1956, and 1957**

Country	1950	1955	1956	1957
Belgian Congo	5,675	9,443	10,019	9,029
Canada	292	1,650	1,769	1,850*
United States	329	946	1,400	1,625*
Northern Rhodesia	739	871	1,271	1,566
Germany <sup>(a)</sup>	331	1,093	1,031	1,082
Morocco <sup>(b)</sup>	463	834	716	720*
Others <sup>(c)</sup>	71	63	94	128*
Total	7,900	14,900	16,300	16,000*

\* Estimated. <sup>(a)</sup> From pyrites mined in Finland and from scrap. <sup>(b)</sup> Cobalt content of concentrate. Metal output somewhat smaller. <sup>(c)</sup> Includes Australia, Mexico, Japan and others.

cobalt ratio of these ores varies within wide limits, the cobalt production can rather easily be adapted to the fluctuations of consumption through a careful choice of the ores to be processed. The producers are thus in a flexible position to respond rapidly to a rising trend in world consumption of cobalt.

On the other hand, production capacity will be increased by some 7,000 short tons within a few years, by new plants or plant extensions of Sherritt Gordon Mines Ltd., Canada (production started in 1956); Chibuluma Mines Ltd., Northern Rhodesia (1957); Metallurgical Resources Ltd., New York (1958); Freeport Sulphur Company, Cuba-Louisiana (1959); Union Minière du Haut-Katanga, Belgian Congo (1960); and Frobisher Ltd., Uganda.

Production statistics in accompanying table take into account not only the direct mine output, but also production from scrap and residues of pyrite roasting. The 1957 production figure is estimated; the final figure will probably come very near to the all-time production record established in 1956.

While consumption is showing a small decrease in the United States, 1955 (4,870 short tons), 1956 (4,781), and 1957 (4,630), the world total consumption of cobalt is steadily increasing.

## DIAMOND

### "The capacity of diamond mining companies cannot meet the sustained demand for gem stones"



ANTOINE MOYAR  
Economic Counsel, Forminiere, Brussels, Belgium

The year 1957 was a most satisfactory year for the diamond mining industry.<sup>1</sup>

World production of diamonds during 1957 was the highest on record. Official production figures become available only much later in the year for most countries, but total production can now be estimated to be of the order of 26,000,000 metric carats, an increase of roughly 2,200,000 carats, or eight percent over the previous year.

This increase is due mainly to higher output in Belgian Congo, Ghana, and Angola.

No major discoveries of new deposits were reported this side of the Iron Curtain; toward the end of the year the Russian Minister of Geology announced the discovery of diamond deposits in the drainage basin of the Upper Aldan. This would indicate the area Southwest of Tommot, many hundreds of miles to the South of the Vilyui diamond fields.

**BELGIAN CONGO:** By weight, Belgian Congo is the leading diamond producing country, accounting for 61 percent of the world total.

Its diamond production was about 15,650,000 carats in 1957, which means a progress of 1,640,000 carats or 11 percent over the 1956 production. The Societe Miniere du Beeka, which owns the Bakwanga mine and is the most important producer

of industrial diamonds in the world, increased its production from 13,500,000 carats in 1956 to more than 15,000,000 carats in 1957; 97 percent of these were industrial diamonds, mostly crushing board. This production was entirely absorbed by deliveries to the market. Construction of a central treatment plant is in progress at Bakwanga, and the first half of this plant (two sections out of four) is expected to be operating by the beginning of 1959. This will increase the capacity of production through higher efficiency.

On the Kasai alluvial fields, output was maintained at about 600,000 carats, comprising 30 percent of gemstones in average. Both the Bakwanga mines and the Kasai diamond fields are operated by the Forminiere Company as a single unit, under an agreement concluded with the four other concession-holding companies.

**SOUTH WEST AFRICA:** Owing to the high average size (one stone per carat) and the fine quality of the diamonds recovered, this Territory is the leading diamond producer, by value. The main producing company, Consolidated Diamond Fields of S.W.A., operating in Diamond Area No. 1 at Oranje-mund, has produced about 850,000 carats during the first 10 months of 1957. More to the north, Industrial Diamonds S.A. Ltd. (INDOSA) operating in Diamond Area No. 2 at Saddle Hill, produced about 46,000 carats of industrials during the same period.

**UNION OF SOUTH AFRICA:** Owing to the exhaustion of the Kleinze diamond fields in Namaqualand, and the gradual deepening of mining operations in the pipe mines of De Beers Consolidated Mines at Kimberley and the Premier mine, Transvaal, over-all production for 1957 might be several percent lower than the previous year. The pipe mines account for about 85 percent of production, the balance being produced by the fields operated by the State at Alexander Bay, and by individual diamond diggers in the alluvial fields of Transvaal and the Cape Province.

1. This is an abstract of the complete report in English on the diamond industry which is being published as *The Diamond Industry in 1956-1957* by VLAAMS ECONOMISCH VERBOND, Schoenmarkt 31 VII, Antwerp, Belgium, Price \$2.50. Mr. Moyar is author of this leading survey which includes description of Mining, Trade, Industrials, and Polishing. Copies may be obtained shortly by writing directly to Antwerp.

**GHANA (Gold Coast):** The alluvial diggings worked by Africans in the Tarkwa and Oda districts produced nearly 1,700,000 carats during 1957. To this must be added the production of the companies, most important of which is CAST (Consolidated African Selection Trust) which produced about 1,150,000 carats in 1957, a progress of about 200,000 carats over 1956. Akim Concessions produced 24,000 carats. Assuming the production of the other companies to have remained at the same level as in 1956, the total for the year would be about 3,000,000 carats, a progress of roughly 500,000 carats, or 20 percent over 1956.

**SIERRA LEONE:** The official production figure is unpredictable and has little significance anyway, owing to the magnitude of the diamond smuggling operations towards the Liberian border. During the year 1957, Sierra Leone Selection Trust produced about 500,000 carats. This company's remaining mining leases and developed reserves were broken into by about 12,000 illicit African miners. Moreover, in August 1957 its treatment plant at Yengema was invaded by a riotous mob which looted the safes and plundered the supplies. The Government sent reinforcements of police and military to restore law and order. In addition to the production of the concession-holding company, growing quantities of diamonds from the African licensed diggings are being sold to the Diamond Corporation Sierra Leone, officially authorized buyer.

**LIBERIA:** Official diamond exports from Liberia are estimated to have been between 850,000 and 900,000 carats in 1957, somewhat lower than the previous year's 1,000,000 carats export. Belgium has officially imported from Liberia 740,000 carats of cuttable diamonds in 1957, against 806,614 in 1956. To this should be added official exports to the U.S.A., Lebanon, etc. According to expert opinion, the diamonds arriving in Antwerp from Monrovia are predominantly stones of the Sierra Leone type; others are classed as French Guinean type, and others are considered to come from Liberian diggings. These local diamond fields are reported to extend along a section of the Loffa River, north of the Bomi Hills iron ore deposits, in the western province bordering Sierra Leone. In April 1957 this area had been closed to diamond prospecting and dealing by the government, following a "diamond rush" of men deserting the rubber plantations to dig for diamonds. Diamond dealing is now permissible in the City of Monrovia only.

Measures to control diamond production and export have recently been announced by President Tubman.

**FRENCH EQUATORIAL AFRICA:** Production for the first three quarters has fallen to 87,245 carats; the yearly figure might be below 1956 by more than 20,000 carats. The grade is declining in most of the deposits now being worked.

**FRENCH WEST AFRICA:** (Guinea and Ivory Coast) produced 171,500 carats during the first three quarters, but exported 197,760 carats during the same period. The year's total is difficult to estimate, owing to local disorderly developments. The concessions of the companies operating in Guinea, especially the Soginex, were invaded by about 20,000 "outlaw" miners, most of whom had been expelled from Sierra Leone at the end of 1956. Under the pressure of events and of the local government, Soginex surrendered part of its concessions and developed reserves to the native diggers; however, encroachments in its remaining leases continue, and tend to increase, as the deposits skimmed by Africans using primitive and wasteful methods are rapidly becoming exhausted.

**ANGOLA:** The Companhia de Diamantes de Angola (DIAMANG) holds exclusive diamond mining and prospecting rights. Production during 1957 amounted to 860,000 carats, an increase of 120,000 carats or 16 percent compared with 1956. About 60 percent of this production is gem quality. A state-controlled company was formed in Lisbon for the cutting of Angola diamonds. DIAMANG and the Diamond Corporation, London, have subscribed part of the capital of the new company, besides the Portuguese Government and four banks.

**TANZANIA:** Diamond exports for the first 11 months amounted to 348,000 carats. The 1957 production is estimated at about 375,000 carats, most of which have been produced in the Mwadui mine of Williamson Diamonds Ltd., except about 20,000 carats from the neighboring mine of Almasi Ltd., a subsidiary of Tanganyika Diamond & Gold Development.

The rich Mwadui pipe mine was the property of the late Dr. John Thorburn Williamson, a Canadian geologist, whose death was announced in January 1958 from the mine, where he lived unobtrusively. His discovery of the deposit in 1940, through geological inference and tenacity when he was at the end of his resources, is an epic of the mining industry. The company has a delivery contract valid until the end of 1960 with the Diamond Corporation.

**BRAZIL:** Nobody knows the exact amount of the Brazilian diamond production, as there is practically no control on the thousands of "garimpeiro" miners, and the major part of the diamonds is exported illegally. There had been no official exports of cuttable diamonds since 1949, but owing to an im-

provement in the international value of the Cruzeiro, token exports were reported at the end of 1956.

**VENEZUELA:** Exports for the first half-year 1957 were 15 kilograms (gross weight) worth 3,954,036 Bolivars. Production for the year is expected to be comparable, probably somewhat lower, than the 1956 total of 93,834 carats. All mining was done by individual "mineros de libre aprovechamiento," in the free areas proclaimed by the government.

**BRITISH GUIANA:** During the first nine months of 1957, the Guianese "pork-knockers" found 169,080 diamonds weighing 20,650 carats. Assuming the same level of output to have prevailed during the last quarter, production for the year 1957 should be about 27,000 carats, a somewhat lower figure than that of the previous year.

**OTHER PRODUCING COUNTRIES: INDONESIA (Borneo), INDIA, and AUSTRALIA** are minor producers of little world importance, where diamond production tends to decline.

**U.S.S.R.** Something more is known about the recently discovered Siberian alluvial diamond fields and kimberlite pipes. The Russian Ministry of Geology, Moscow, published in 1957 the book "Almazi Sibiri" (Siberian Diamonds) a scientific work (price: 15 Rubles) of considerable geological interest. Three major diamondiferous pipes are mentioned, one in the Vilyui area, and two in the Daldyn area. In both pipes and alluvials, very few large stones are found, the greater part being extremely small diamonds and slivers. The average weight would appear to be about 0.07 carat, and about 80 percent of the total to be crushing boart. Organized mining does not seem to have started.

The announcement from Johannesburg of the death of Sir Ernest Oppenheimer in November 1957 was received with regret throughout the mining industry. The late Sir Ernest was the outstanding figure in the world of diamonds and gold mining. He has been succeeded as chairman of De Beers and Anglo-American Corporation by his son, Mr. Harry Oppenheimer, M.P.

#### Mine Production of Diamonds by Countries in Metric Carats for 1955, 1956, and 1957 (Estimated)

Country	1955	1956	1957 (Est.)
Belgian Congo	13,041,487	14,010,455	15,645,000
South Africa	2,628,916	2,585,728	2,580,000
South West Africa	812,848	988,653	996,000
Ghana (Gold Coast)	2,258,270	2,539,428	3,000,000
Sierra Leone	418,077	549,091	875,000
Liberia (Exports)	203,544	1,025,034	850,000
Angola	743,378	740,035	860,000
Tanganyika	325,523	358,717	375,000
French Equat. Africa	136,960	145,840	110,000
French West Africa	318,450	389,700	220,000
Brazil (Estimated)	300,000	250,000	250,000
Venezuela	141,147	93,834	90,000
British Guiana	33,300	29,816	27,000
Other Countries	15,000	12,000	12,000
<b>TOTALS</b>	<b>21,376,900</b>	<b>23,718,331</b>	<b>25,890,000</b>

1. Excluding African diggings.

Shortly before his death, the late Sir Ernest, in his 1957 Christmas message to the people of Kimberley in "Diamond News", wrote: "I am happy to say that the diamond industry continues to enjoy exceptional prosperity. The capacity of diamond mining companies cannot meet the sustained demand for gem stones; and, despite the end of stockpiling by the United States, sales of industrial diamonds have been well maintained. The industry's diamond research program continues to evolve new and improved methods of diamond recovery and also to find fresh outlets and uses for diamonds, thus widening the application of diamond tools."

**OUTLOOK:** The above message summarizes the outlook for the diamond mining industry. Diamond marketing is in strong hands, and a special reserve of £20,000,000 has been built up by the Diamond Corporation to ensure at all times the stability of the diamond industry and market.

If the shortage of diamonds is alleviated through increased production in the near future, black market prices, illicit dealing, and smuggling will gradually disappear, which will be a blessing to the industry.

As to the competition of stones of the synthetic variety manufactured by General Electric, tests made both in Europe and the United States seem to indicate that these minute grains, comparable in quality and size to crushed boart, are suitable for use in resin-bonded wheels, but that for metal bonded or ceramic wheels and tools, natural crushing boart, which is harder, is more efficient. Its price is also appreciably lower, and consumption and industrial applications are constantly expanding.

The mining industry considers for the present the synthetic industrial abrasives as an additional production of a commodity in short supply.

# FLUORSPAR



## "The brisk, growing, and optimistic phase of the fluorspar industry is in the acid grade"

J. BLECHEISEN  
President, Rosiclare Lead &  
Fluorspar Mining Company,  
Roscilare, Illinois

Fluorspar consumption by the steel, aluminum, and chemicals industries reached an all-time high in 1957 of 660,000 tons, up 10 percent from 1956, and up 50 from 1950; this consumption rise was paralleled by the continuing sensational and increasing rise in foreign imports. During 1957, foreign imports, principally from Mexico, reached a top high of 620,000 tons, up 30 percent from 1956 and up 150 from 1950. Contrariwise, the situation of the domestic fluorspar producers continued to be confounded by the impact of rising imports and their declining percentage participation in United States' consuming market, when in 1957 domestic production totalled only 325,000 tons, down 2 percent from 1956, despite the domestic industry's current ore reserves and milling capacity substantially sufficient to meet consumption needs.

### Fluorspar Consumption, Domestic Shipments, and Imports in Short Tons for 1950, 1956, and 1957

	1950	1956	1957
1. Consumption—of domestic and foreign origin	425,000	620,000	660,000
2. Domestic shipments*	300,000	330,000	325,000
a. Relationship of domestic shipments to consumption	75%	55%	50%
3. Foreign imports*	165,000	485,000	620,000
a. Relationship of foreign imports to consumption	40%	80%	95%

\*NOTE: The total of domestic shipments and foreign imports, in any one year, exceeds 100% of consumption—the excess represents (a) inventory increases at consumer's plants, and (b) government stockpile shipments, not consumed.

Fluorspar is marketed in three commercial grades—*metallurgical* for steel and iron foundries; *acid* for aluminum, hydrofluoric acid, and the fluorine chemicals; and *ceramic* for glass and porcelain enamel. Of the 660,000 tons of fluorspar consumed in the United States in 1957, nearly 50 percent of it (320,000 tons) went into aluminum, hydrofluoric acid, and the fluorine chemicals; about 270,000 tons went into steel and iron foundry usage; and the remainder (70,000 tons) went into ceramics, glass, and other miscellaneous uses.

The brisk, growing, and optimistic phase of the fluorspar industry is in the *acid* grade. Of the 320,000 tons of acid grade fluorspar consumed in 1957, 110,000 tons of it went into aluminum, and the remaining 210,000 tons were used in producing 85,000 tons of hydrofluoric acid—which went into fluorocarbon chemicals, like DuPont's Freon, General Chemical's Genetron, and Penn Salt's Isotron, for propellants, refrigerants and fluorine resins; uranium and atomic energy processes; and elemental fluorine and high octane gasoline.

As to domestic production, here are 15 states which have figured historically in fluorspar production, and have fluorspar mineral areas: Arizona, California, Colorado, Idaho, Illinois, Kentucky, Montana, Nevada, New Hampshire, New Mexico, Tennessee, Texas, Utah, Washington, and Wyoming. However, only six states produced and shipped fluorspar in 1957:

(a) Southern Illinois and western Kentucky area (Illinois-Kentucky). This area accounted for nearly 200,000 tons of the total production in 1957, or 65 percent thereof.

(b) The four western states of Colorado, Montana, Utah, and Nevada. This area produced approximately 125,000 tons of fluorspar in 1957; Colorado and Montana accounted for approximately 50,000 tons each.

Foreign imports of fluorspar in 1957 equaled nearly 95 percent of America's consumption—620,000 tons of imports against 660,000 tons consumption. Foreign fluorspar came into the United States in 1957 from Spain, Germany, Canada, Italy, and Mexico, the latter accounting for approximately two-thirds of the foreign imports in 1957.

Substantial United States interests have fluorspar operations in Mexico, notably Penn Salt Company, American Smelting & Refining Company, Dow Chemical Company, and Reynolds

Metals Company, the latter having completed construction of a large acid-grade fluorspar mill in 1957 at Eagle Pass, Texas, where it beneficiates Mexican ore for use in its aluminum plants. Harshaw Chemical Company, an important hydrofluoric acid producer, erected its own drying plant in Cleveland, Ohio in 1957, where it dries and processes imported European fluorspar for its own account. Walter E. Seibert of the St. Lawrence Fluorspar Company also completed the erection of a fluorspar drying plant in Cleveland in 1957 to dry and process European acid-grade fluorspar for sale in the consuming market in the midwest.

There were four interesting and encouraging developments in the end uses of fluorspar announced in 1957.

(1). The possible use of fluorine as an oxidizing agent in high energy fuels for missiles—this being the latest and most engaging development in the fluorspar field. The California Institute of Technology is working on a fluorine (high energy fuel) program, and the National Advisory Committee for Aeronautics, Washington, D. C., has recently released several reports on fluorine as a rocket propellant, reports which have until now been classified and restricted.

(2). An expansion among the fluorocarbon producer is indicated by the scheduled entry into this field in 1958 of the Union Carbide Company which will produce fluorocarbons at Institute, West Virginia to compete with Freon, Genetron, and Isotron—these chemicals being used for propellants in pressurized containers, refrigerants in cooling systems, and fluoroplastics. Also, there is to be an enlargement of hydrofluoric acid facilities by a new plant addition in 1958 at Louisville, Kentucky of Stauffer Chemical Company, a present hydrofluoric acid producer.

(3). Hydrofluoric acid consumption used in the atomic energy program is scheduled for increase when General Chemical Company opens its UF<sub>6</sub> plant in 1959 at Metropolis, Illinois, where it will process U<sub>3</sub>O<sub>8</sub> for the Atomic Energy Commission.

(4). Kaiser Aluminum entered into working arrangements in 1957 with leading phosphate rock processors for the acquisition of their fluorine byproducts to be used by it in the production of aluminum fluoride and artificial cryolite—essential electrolytes in the metallurgy of primary aluminum. This program, if successful, opens up the possibilities of deriving fluorine compounds from phosphate rock in adequate commercial quantities, and, if fully developed, may prove to be a substantial and continuing source of fluorine.

Also, major fluorspar operators and consumers were engaged in widespread fluorspar surveys during 1957. In the southern Illinois and western Kentucky area, at least five different geological survey teams made extensive investigations, and some of them are still in the area. In the western states of Colorado, Texas, California, and New Mexico, like geological survey teams worked during 1957.

Reasonable forecasts for 1960 suggest a fluorspar consumption in the United States of 1,000,000 tons.

### Fluorspar Consumption by End Uses in Short Tons for 1950, 1956, and 1957 with Forecast for 1960

End Uses	1950	1956	1957	1960 Forecast*
Steel	240,000	265,000	270,000	335,000
Aluminum	55,000	110,000	110,000	175,000
Hydrofluoric acid—for	70,000	175,000	210,000	400,000
a. Uranium and Atomic Energy				
b. Fluorocarbons (Freon, Genetron, Isotron, etc.)				
c. High octane gasoline, elemental fluorine, and miscellaneous uses.				
Ceramic and other uses	60,000	70,000	70,000	90,000
Total consumption (000 - tons)	425,000	620,000	660,000	1,000,000

\*Based (1) on the total of existing and projected steel capacity of 140,000,000 tons and primary aluminum capacity of 2,500,000 tons; (2) expansion of hydrofluoric acid usage (a) in uranium processing at A.E.C.'s six atomic energy plants, and at General Chemical's new uranium hexafluoride plant at Metropolis, Illinois, (b) in basic fluorocarbons (Freon, Genetron, Isotron, and Union Carbide's fluorocarbon not yet trade named), and (c) in high octane gasoline and elemental fluorine; and (3) increasing usage of fluorspar in porcelain enamel for building construction, and in miscellaneous fluoride salts.

## GOLD



HENRY G. GRUNSTEDT  
Manager Engineering  
Services, Mining World

Gold again became more and more the topic of discussion with interested groups throughout the world in 1957. The hue and cry for an increase in the price of gold is presently stronger than ever, as is always the case during declining business conditions. Also, a condition of rising costs and a stable gold price, have forced all but a few of the major gold mines to shut down.

In the United States mine production of recoverable gold declined approximately three percent during 1957 for the second consecutive year. Among the principal gold-producing states small production gains were noted in Arizona, Nevada, and Washington; however, these gains were more than offset by reduced production in California, Colorado, and Montana. Gold production from South Dakota and Alaska were about the same in 1957 as they were in 1956.

South Dakota continued to rank as the leading United States gold producer, followed by Utah, Alaska, and California—the same order as in 1956. Over 75 percent of United States gold production came from these areas. Gold output of Alaska, California, and South Dakota was obtained by straight gold mining operations, while the balance of production was obtained as a byproduct of base-metal operations.

Total United States gold production for 1957 amounted to 1,768,624 ounces, as compared to a 1956 production of 1,865,200 ounces.

It is interesting to note that gold production in both Canada and Australia were up, due mainly to government support. And

the Canadian government recently extended federal subsidies to mines for another two years, until December 31, 1960.

In Germany, complete convertibility of the Deutsche Mark is now a reality. Freedom has been restored to the German gold market as of April 1, 1957. Also, gold may be imported from any soft-currency country. As a result, Germans can buy as much gold as they can afford, and pay for it in D-Marks. According to German government reports, more than half of the 15,100,000,000 D-Marks (\$3,600,000,000) in circulation are now covered by gold deposits.

The sale of Russian gold is continuing in western markets. Official estimates place total sales of Russian gold in 1957 as some 4,300,000 ounces. Probably less than one third of the Soviet Union's annual production. Part of these sales were made on the Continent, mainly in Switzerland for transferable Sterling. But probably the larger part of this gold eventually found its way to London. Indirectly Russian sales of gold have given some relief for Britain's hard-pressed gold and dollar reserves. Such sales against transferable Sterling reduce the need for support of that type of Sterling by British authorities, and helped push up the value of the pound.

Even under present conditions of rising costs and a stable gold price, it is interesting to note that new gold mining developments are being actively carried on. At the Western Deep Levels Limited, about 50 miles west of Johannesburg, Union of South Africa, an outlay of \$56,000,000 will be made to sink a 12,000 foot shaft and to do other necessary work to bring this mine into production; to eventually produce gold worth approximately £800,000,000. Approximately six years will be required to bring the mine into full production.

Apparently some people still have confidence in the future of gold.

## IRON



### "Will the search for iron switch from direct shipping ores to those readily beneficiated?"

M. E. VOLIN  
Director, Institute of Mineral  
Research, Michigan College  
of Mining and Technology,  
Houghton, Michigan

The slow-down in some business activities that spread to other segments of United States economy as 1957 advanced, did not reach the iron ore industry until late in the year. By that time the Great Lakes shipping season was well along and it was a good season tonnagewise; from the opening on April 9 to December 15, the closing date, 84,614,734 gross tons moved to the Lower Lake ports and steel centers. Mine production in all districts of the United States increased by about 11 percent over that of strike-crippled 1956. Domestic production of useable iron ore and agglomerates came to 105,386,000 gross tons in 1957, according to preliminary figures of the U. S. Bureau of Mines. Nearly 65 percent came from Minnesota, 13 from Michigan, a little under 2 from Wisconsin, and the rest from 13 other states. Production from the seven western states reached a new high level.

Imports of iron ore and agglomerates followed the established trend in reaching a new high level. The American Iron Ore Association reported total receipts of 33,911,922 gross tons of iron ores and agglomerates from foreign sources, a 14 percent increase over 1956 imports. Canadian shipments decreased 2 percent because of curtailment of production in some of the Lake Superior region mines, but imports from other countries jumped 25 percent. Nevertheless, Canada was the largest supplier and shipped a third of the imported iron

ores. Venezuela was in second place and scored the biggest increase in shipments. Chile, Peru, and Brazil were the other principal suppliers and all showed good gains.

More pellets and other agglomerates came to market, and more of the ores received some form of beneficiation before shipment. Thirty percent of all of the Lake Superior ores shipped in 1956 had received beneficiation or agglomeration while in 1957 these treated ores were estimated to make up over 40 percent of the total shipments. Six new beneficiation plants went into operation in Minnesota in 1957, bringing the total to 78 in that state. More of the ores were screened and sintered before being charged to the blast furnaces. Construction of new sintering plants in progress in 1957 will, upon completion, bring sintering capacity at the furnaces to approximately 50,000,000 annual tons.

This trend towards improved raw material iron started with the influx of the high-grade foreign ores and became further established when domestic pellets and other agglomerates arrived at the furnaces in appreciable tonnages. Furnaces that had yielded 7,500 tons of pig iron a week with the Lake Superior District shipping ores produced as much as 9,400 tons when charged with the high-grade ores, taconite pellets, or sintered agglomerates. This meant increased production without building more of the expensive blast furnaces. Furthermore, consumption of coke was lower, and other savings were realized through decreased slag volumes. All of these things added up to lower overall operating costs even though more money had to be spent in mining, beneficiating, and shipping the ores long distances. As a result, emphasis shifted from the cost of ore to the cost of the metal in the ladle. Now the furnace operators demand iron raw materials specifically

tailored with respect to grade and physical structure to give the best furnace productivities and economics. Is this the beginning of a revolution in iron ore production and smelting? Will even the better Lake Superior shipping ores have to be treated to improve their chemical analysis, structure, and size? Will the search for iron shift from direct shipping ores to those which can be readily beneficiated into premium quality raw materials?

The search for and development of new sources of iron ore to supplement the traditional Lake Superior production continued vigorously. Large beneficiation plants figured prominently in many of the Canadian developments. As hopes of finding high grade deposits diminished, attention turned to the large, low-grade deposits yielding ores that can be beneficiated by magnetic methods. Products running from 65 to 68 percent iron were desired to minimize the shipping costs in terms of iron units. At least one company was investigating more complex treatment methods for a reserve of enormous proportions. Several companies were busy in that great arc of iron formations extending from the west coast of Ungava Bay to the Mistassini Area of Quebec Province. Quebec Cartier Mining Company, a subsidiary of U. S. Steel Corporation, made plans for a beneficiation plant of 5,000,000 annual tons capacity to be installed at Mt. Wright, Quebec Province by 1961.

South America and other overseas countries had their share of iron ore developments, too. In Venezuela ore deposits near Cerro Bolívar and a new project at El Trueno were under consideration. A survey by the Brazilian Government revealed vast iron deposits in the state of Minas Gerais. High-grade hematite ores are mined there now, but the itabirites or low-grade ores must await new beneficiation techniques. A new mine being developed in Orissa Province, India, will start producing by 1960 from a reserve of 150,000,000 tons of ore averaging 54 to 65 percent iron.

The domestic iron ore industry had important developments too. Production of taconite was boosted materially when the new Erie Mining Company plant began initial operations late in 1957. The Reserve Mining Company's plant more than measured up to expectations in producing over 5,000,000 tons of pellets during the year. Michigan's two low-grade jasper plants and the Eagle Mills pelletizing plant were in steady operation. Hanna Coal and Ore Corporation started construction of another jasper plant at Groveland on the Menominee Range. Kaiser Steel Corporation continued a long-

range expansion program involving new furnaces at Fontana, California and a new jigging plant at the Eagle Mountain mine. U. S. Steel Corporation started testing an extensive low-grade deposit in Fremont County, Wyoming. Bethlehem Steel Company was near the production point at the Grace mine and 6,000-ton-a-day plant at Morgantown, Pennsylvania. Encouraging reports of exploration in Missouri by St. Joseph Lead Company held promise of a major development from which production of 2,000,000 tons a year was thought possible.

Among other things, 1957 was a year of increased emphasis on research. Direct reduction of iron ores came into the lime-light again as a number of new processes were announced. Republic Steel Company and National Lead Company announced the R-N process which reduces both low-and high-grade ores in a rotary kiln with low-grade fuel. Bethlehem Steel and HydroCarbon Research Inc. reported their H-iron process to be near economic realization; it uses hydrogen for reduction and operates at high pressures. United States Steel Corporation is designing an experimental plant based on the Shipley patents. Arthur D. Little Inc. is developing a process based on Eso Research and Engineering Company patents. Julian Madaras has developed a retort for direct reduction. The Dwight-Lloyd division of McDowell Engineering Company, is building a pilot plant to demonstrate the Dwight-Lloyd-McWane process. The Freeman process has had wide publicity in Canada. The Krupp-Renn process seems to be gaining a limited but firm foothold where it fits into the economic picture.

As exploration reveals more about the iron formations of the Western Hemisphere, it is becoming apparent that there are important reserves of fine-grained hematitic ores that cannot meet specifications as direct shipping ores and need upgrading for the long transportation to market; yet these ores are beyond the reach of flotation or other established mineral beneficiation methods. One of the possibilities for treating these ores lies in reduction roasting to convert hematite to magnetite and thus make the ores amenable to low-cost magnetic separation. The metallurgy of this process is well understood but heat requirements and other factors make the cost too high for the production of iron ores. Research is being done to bring the magnetizing roasting method within economic reach of the iron ore industry.

Increasing research by the iron and steel industries has exciting implications of a new era in iron ore supply and iron making.



MARSHALL SITTIG  
President and Managing  
Director, American Lithium  
Institute, Inc., Princeton,  
New Jersey

With no new integrated production facilities put into operation in 1957, industry emphasis has been on broadening of product lines and concentration on marketing.

The basic facts of life in the lithium industry have become plain in 1957 and have divested the industry of some of the "glamour" which it had previously had. These are the facts:

1. There is plenty of lithium ore to supply the industry for many years to come and enough to supply almost any foreseeable demand.
2. The United States Atomic Energy Commission revealed in April 1957 that it was purchasing substantial amounts of virgin lithium hydroxide and were separating the isotope lithium-6 (7.5 percent of naturally-occurring lithium) from lithium-7 (92.5 percent of naturally-occurring lithium) and were returning the lithium-7 to a stockpile for repurchase by the suppliers. The quantities and end use of the lithium-6 remain highly classified.
3. Between the productive capacity of industry and the availability of the "tails" material from the A. E. C., the supply of lithium chemicals exceeds demand and provides an adequate guarantee of supply for future uses.

## LITHIUM

### *"There is plenty of lithium ore to supply the industry for many years to come"*

4. Lithium continues to be one of the more unique of all the 100-odd elements. This has been highlighted in 1957 by new applications of lithium metal in heat-resistant aluminum alloys and as catalysts for the manufacture of new synthetic rubbers which duplicate the desirable physical properties of natural rubber.

Production and consumption statistics for the industry remain classified due to the A. E. C. purchasing situation. An authoritative breakdown of lithium chemicals end uses has been published in 1957 which reveals the following breakdown of sales:

#### *Distribution of 1956 Lithium Chemicals Sales*

Application	Percent of Civilian Sales
Lubricating greases	35.0
Ceramics and glass	27.8
Metallurgical and organic	14.7
Storage batteries and misc.	10.2
Air conditioning	7.3
Welding and brazing	5.0
	100.0

The year 1958 will see intensified sales efforts by all the major producers. The ever-growing volume of research results on lithium uses combined with price decreases for lithium chemicals announced late in 1957 should cause sales to reach an all-time high in 1958.

## MANGANESE



### "The Butte program could last until mid-year . . . carlot completed in less than two years"

F. A. McGONIGLE  
Vice President, Manganese,  
Inc., New York, New York

The manganese industry sustained its position most of 1957 but developed signs of a much lowered volume in 1958. Domestic mines shipped an estimated 350,000 short tons of plus-40 percent ore, or almost the same as the 1956 figure of 344,735 short tons. Domestic consumption at 2,350,000 short tons of ore, likewise, was not too much above the previous year's consumption of 2,240,000 short tons, so that again domestic mines supplied only 15.0 percent of United States requirements.

Ferromanganese, together with the other manganese alloys, registered a marked decline in production to parallel the drop in steel ingot output. The major plants curtailed ferro output and one small producer shut down. This condition forecasts both lowered consumption and acquisition of manganese ore in 1958, not only because steel requirements will be less, but also because present ore inventories have been automatically increased and thus ore purchases will be less in order to bring inventories into line.

Foreign ore price on a 46-48 percent basis with other usual terms were \$1.64-\$1.69 per long ton unit in January, but closed the year at \$1.36-\$1.39 per long ton unit with cash transactions about \$0.12 less per long ton unit. Ferromanganese had a maximum quote of \$275.00 and declined \$240.00-\$245.00 a net ton. Foreign ferromanganese could be obtained in December for about \$200.00 ex duty a net ton. Government (General Services Administration) prices were unchanged on the two domestic programs in effect.

The purchase of oxide and carbonate ores continued on the low-grade program at Butte, Montana. An estimated 1,850,000 long ton recoverable units in both types of ores were acquired to bring the total recoverable units on hand to 5,700,000. With the possibility that some additional units may be authorized, the Butte program could last until mid year. There was no activity at the Wenden, Deming, and El Paso low-grade stockpiles.

On the carlot program, an estimated 6,000,000 long ton units were delivered to the G.S.A. Total receipts through December 31, 1957, are estimated to be 16,538,173 long ton units out of 28,000,000 authorized. At the current acquisition rate, this program will be completed in less than two years.

India provided 24 percent of ore needs, but for the first time, in 1957, was supplanted as the principal supplier of ores to the United States, being relegated to second place by Brazil's figure of 30 percent. In Brazil the Amapa mine came into pro-

duction and shipped some 600,000 tons of 48 percent Mn ore to the United States. There were 24 countries from which ore was obtained.

In India, the State Trading Corporation continued to move into the ore exporting business and could very well take over the entire business in another year. The Corporation controls railway facilities as well as export permits. In several instances the Corporation did not meet its commitments and, to the detriment of its reputation and business volume, caused contract cancellations whereby purchasers obtained ore elsewhere at more favorable prices. Brazil, however, did not fall into line, even though its ore was offered. The Brazilian agency held out for around a \$1.45 a long ton unit with few takers, if any.

The failure of the grain crop in India brought about discussions with the United States Government whereby about 1,000,000 tons of wheat would be sent to India under Title I (P.L.480) for rupees, part under Title II (give away) and about \$30,000,000 under Title III (barter). Together with a small tonnage of ferromanganese, India would exchange for the wheat about 150,000 tons of 42 percent Mn ore with a balance of higher grade ore. At the moment it appears that this deal may go through, and if so may involve, as part of the barter, an ore exchange to Hungary for electric motors and an ore exchange with Yugoslavia for industrial equipment. Another effect of a successful barter would be to remove a considerable tonnage of Indian ore from the domestic market and probably prevent further depressed prices.

The USSR appears to have sold about 250,000 tons of high grade ore to England and Europe. None was offered to United States consumers either by sale or by barter. An undisclosed tonnage of ferromanganese and other alloys was sold in Europe by the Russians with a small tonnage of ferromanganese going to Japan.

Research and development work declined somewhat but the U. S. Bureau of Mines continued work on certain hydrometallurgical and pyrometallurgical projects. The Vitro Laboratories, Inc., worked with Government assistance on Colorado rhodonite ores with a hi-arc method. The Manganese Chemicals Corporation was in commercial production of battery grade  $MnO_2$  and fine chemicals from the Cuyuna Range ores.

The future for a domestic manganese industry is bleak unless federal assistance is forthcoming. What is needed is a two fold program with authorized funds by Congress. The program should consist of a) a five year extension of the carlot program, and b) purchase by G.S.A. of domestic ore processed into manganese alloys, the G.S.A. paying the import price for the ore and the market tool price for processing, so that a useable product is obtained.

## MERCURY



### "There are indications of some increase in world consumption of mercury in 1957"

J. ELDON GILBERT,  
Manager, Cordero Mining  
Company, Palo Alto, Califor-

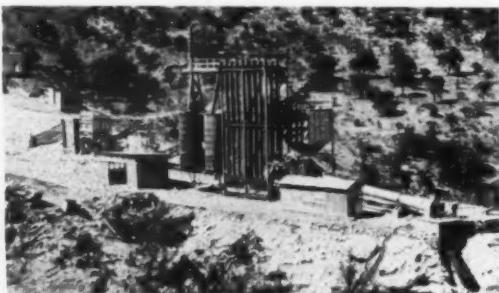
The world's excess production above consumption, which has consistently shown up in review figures of the world's mercury picture for the past several years, began to be felt in the market during 1957. Whereas during 1956 the price per flask sank from \$275 to \$255, and during 1957 it continued to drop from \$255 to \$225, this trend reflected different consumption situations. During 1956 world consumption was relatively high and

the price was set by the market; in contrast, the markets became saturated during 1957 and United States General Services Administration was forced to accept metal at a pre-set price of \$225 delivered to warehouses.

Domestic mercury production continued to increase, as it has each year during the past eight years. Estimated production for 1957 is 31,000 flasks. Much of this increase is coming from new operators of old mines. With the decrease in price, many if not all of the newcomers are wondering why they entered the field. Their actual entry into the mercury mining business took place two to four years ago when the entire picture, especially when viewed from the outside, had a definitely rosy hue. The price was much higher, and rumors of new exotic uses were rampant, especially defense uses. These rumors were

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strengthened somewhat by manipulation of government owned stockpiles, heavy secret buying of some government agency, and by the abrupt announcement by GSA of its purchase program—



George O. Argall, Jr.  
Editor  
Mining World

The domestic molybdenum industry in 1957 was characterized by greater production, decreased consumption, larger exports, a firm market price, and new producers planning output. These all made Molybdenum the Metal of 1957.

On the International scene total world production is estimated as the second highest annual output in history. Consumption outside the United States showed a slight increase.

Molybdenum Production again was and will continue for the foreseeable future to center at Climax, Colorado where Climax Molybdenum Company Division of American Metal Climax, Inc. operates the world's largest underground mine at the world's largest molybdenum deposit. Reserve figures published in 1957 were 418,000,000 tons averaging 0.43 percent MoS<sub>2</sub>. Mine production and molybdenite recovered increased to 10,551,000 tons and 42,466,000 pounds in 1957—highest ore tonnage ever and highest molybdenite recovery in two years. Climax mined its 100,000,000 tons of ore on Feb. 4. Completion of new milling units, a larger number of underground draw points, and well trained employees enabled Climax to

a program which had as one of its goals the acquisition of 125,000 flasks from domestic mines at a time when this represented 10 times the annual domestic production. Authorization was also made to purchase 75,000 flasks of Mexican production.

During the late summer of 1957 the price fell to an equivalent of \$225 delivered to GSA depots and producers prepared to deliver to GSA. The producers were stymied, however, by having GSA insist on seamless flasks which did not exist and which no one was making. These flask specifications were eventually relaxed somewhat by redefining the word "seamless" to include flasks with seams if the seams did not show. The whole controversy took on an Alice in Wonderland aspect. In December GSA announced they would accept, as part of 1957 quota, metal produced in 1957 if delivered in suitable containers by March 31, 1958.

Among the producers the order of production may have changed somewhat during 1957 but the same mines that were the larger producers in 1956 still produced 90 percent of the metal with two-thirds of it coming from the following five mines (listed in probable order of contribution): New Idria mine, New Idria Mining and Chemical Company, San Benito County, California; Red Devil mine, DeCoursey Mountain Mining Company, Inc., Alaska; Cordero mine, Cordero Mining Company, McDermitt, Nevada; Abbott mine, California Quicksilver Mines, Inc., Williams, California; and Idaho-Almaden mine, Rare Metals Corporation of America, Weiser, Idaho.

There are indications of some increase in world consumption of mercury in 1957. Germany and Japan both reportedly are increasing their uses. India either bought some metal for immediate use or as part of their long-range plan for industrial growth. Mercury went to Brazil during the year, and several other countries increased purchases to some extent. In respect to Russia, the market situation became reversed! For years it has been assumed that mercury produced in the Free World had been quietly shipped behind the Iron Curtain. Suddenly, in 1957—the year of Sputnik—Russia apparently became self-sufficient in mercury, so much so that at least twice during the year there were reports of Russian metal for sale in European markets. Specific figures on consumption are difficult to obtain and are frequently in error.

World production figures can be accumulated with more accuracy and for 1957 they are impressive. Italy probably led in world production with about 65,000 and Spain following with about 60,000. Other major foreign producers with approximate production are: Mexico 20,000; Yugoslavia 12,500; Japan 7,000 and Philippines 3,400. These, added to United States, total about 200,000 flasks for the Free World production. The best ouija boards indicate that this production exceeds consumption by about 50,000 flasks.

## MOLYBDENUM

*"In Canada exploration for molybdenum reached record heights during the year"*

set this production record. Climax is planning for the future, too, and started construction of a new 34,000-ton-per-day by-product plant, a 320,000,000-ton tailing disposal area, and made preparations for a new underground circular shaft to the 1,000-foot level.

A strike at the Langeloth, Pennsylvania roasting plant made it necessary for Climax to ship concentrates to the idle roaster plant of Beattie-Duquesne Mines Limited at Duparquet, Quebec, Canada for treatment.

There was no production from the Questa, New Mexico mine of Molybdenum Corporation of America during 1957. This mine has been the second largest straight molybdenum producer for a number of years. However, a \$510,500 DMEA exploration contract was started during the year to prospect the upper level area of the mine in the hope of developing a large tonnage of low-grade ore which could be mined profitably by a mass mining system. At year's end the project had not progressed far enough to determine what the chances for such might be.

Straight molybdenum mine output was up 13 percent over 1956.

Byproduct Production from porphyry copper ores decreased about eight percent as less copper ore was mined following cut backs by major mines to bring supply closer to demand.

Kennecott Copper Corporation's Utah Copper Division was the largest byproduct and second largest producer again. During the year the mill heads averaged 0.50 percent MoS<sub>2</sub> (1.0 pound

per ton). According to reports the molybdenum content of the ore mined in recent years has declined.

San Manuel Copper Corporation's San Manuel mine made the greatest gain in byproduct as tonnage mined increased sharply over that for 1956. Output in 1957 was 1,452,080 pounds (591,970 in 1956) from 8,825,130 tons milled (0.16 pound or 0.008 percent per ton). San Manuel will not sell any of its output to the government as originally planned when the company received a government loan. However, the company announced early in 1958 that the MoS<sub>2</sub> content of the ore has been and is expected to be less than originally estimated, but may improve somewhat in future years.

The Morenci copper mine of Phelps Dodge Corporation produced 840 tons of molybdenite concentrate during the year. Other Arizona byproduct producers were Bagdad Copper Company, Silver Bell mine of American Smelting and Refining Company, and Miami Copper Company. Inspiration Consolidated Copper Company's new molybdenite flotation circuit was being installed at year's end. It is estimated that the \$561,132 cost will be returned within two years after production starts.

New Mexico's output was all from Kennecott Copper Corporation's Chino Mines. Union Carbide Nuclear Corporation's Pine Creek, California tungsten mine again produced byproduct molybdenum. With the rapid decline in tungsten price, ores with higher molybdenum and copper were mined.

Nevada shipments again came solely from the Nevada Mines of Kennecott Copper Corporation, and Consolidated Coppermines Corporation. However, Getchell Mine, Inc. installed a molybdenum flotation circuit to recover byproduct sulphide molybdenum from tungsten ore mined at its Moly underground mine. Concentrates were produced but not marketed.

**Foreign Developments** centered in Canada where exploration for molybdenum reached record heights during the year.

Molybdenite Corporation of Canada Limited continued as the major producer. It mined and milled 169,601 tons averaging 0.46 percent MoS<sub>2</sub> from the La Corne mine. Ore reserves were maintained and the first full year's production of technical grade molybdate oxide was achieved. The firm's nearby subsidiary—Preissac Molybdenite Mines Limited—estimated on dia-

#### Mine Production of Molybdenum in Pounds by Countries For 1953, 1954, 1955, 1956, and 1957

Country	1953	1954	1955	1956	1957
Canada	194,000	452,000	774,000	871,000	874,000
Chile	3,031,000	2,663,000	2,817,000	3,121,000	3,100,000
Japan	397,000	450,000	439,000	534,000	525,000
Republic of Korea	20,000	22,000	24,000	31,000	34,000
Mexico		159,000	55,000	33,000	40,000*
Norway	317,000	335,000	379,000	366,000	365,000
United States	57,243,000	58,668,000	61,781,000	57,462,000	60,830,000
Yugoslavia	1,920,000	441,000	948,000	800,000*	462,000*
Others	888,000	710,000	683,000	982,000	400,000
Total	63,800,000	63,900,000	67,900,000	63,200,000	66,630,000

\* Estimated.

mond drill results that 1,000,000 tones of ore to a 500-foot depth had been developed. Funds are being raised to develop and equip the mine and build a 1,200-ton-per-day flotation plant.

Climax Molybdenum Company continued its active drill exploration campaign in British Columbia and investigated other prospects. On Boss mountain drilling continued in the molybdenite mineralized quartz diorite.

Other exploration campaigns for molybdenum were conducted by Sogemines Development Limited (Belgium) and Rio Canadian Exploration Limited (Rio Tinto Mining Company of Canada Limited) which formed Pidgeon Molybdenum Mines Limited to diamond drill favorable claims near Sioux Lookout, Ontario. Quebec Metallurgical Industries Limited drilled and drifted at the Kirkham mine near Shawville, Quebec. De Coursey-Brewis Minerals Limited owns claims near Sioux Lookout and plans exploration.

All of Chile's output was a byproduct of copper mined and milled by Kennecott's subsidiary, Braden Copper Company. At year's end work on the new byproduct circuit at Anaconda Company's Chuquicamata flotation plant was nearly completed. Important production will be made at this mine in 1958.

## NICKEL

### "The supply-demand situation throughout the world in 1958 should be in close balance"

DR. JOHN F. THOMPSON  
Chairman of the Board, International Nickel Company of Canada, Limited, New York, New York

The year 1957 brought a turn-about in the supply-demand situation for nickel. After many years of nickel shortage for civilian purposes, the combined supply of market and premium price nickel came into close balance with demand in nearly all areas of the world during the last part of 1957. In fact, in the largest market, the United States, the supply exceeded the demand.

This change was brought about by a record high Free World production, sharply reduced defense demands, and the United States government's endeavor to divert to industry during the year all nickel scheduled for stockpile intake. The last two factors had the effect of greatly increasing the civilian supply in the United States. Some nickel was also released from the United Kingdom's stockpiles for distribution in that country.

Free World nickel supplies in 1957 were estimated at 490,000,000 pounds, compared with the previous high of approximately 450,000,000 pounds in 1956.

Deliveries of the metal by the several Canadian producers reached a new high total of about 360,000,000 pounds, representing approximately 75 percent of the Free World's entire supply. Of the balance available to the Free World, Cuba accounted for about 9 percent; United States, 4 percent, and New Caledonia, Japan, and others, 12 percent.

International Nickel, the world's largest producer, operated at capacity in 1957 for the eighth consecutive year. The company's deliveries, in all forms, exceeded 290,000,000 pounds, or about 5,000,000 pounds above 1956.

The year 1957 marked the first full year of development at

International Nickel's new project in northern Manitoba. In the Thompson-Moak Lake area 400 air miles north of Winnipeg, the company is opening a new nickel mining operation and building a smelter, mill, a modern town, and ultimately a refinery. A recent major development was the completion on October 20, 1957 of a 30-mile railway spur. This spur, linking the project's plant site area at Thompson with the Canadian National Railways' Hudson Bay line, now provides year-round transportation for men, equipment, and supplies.

The year saw the announcement of two other important projects which are aimed at increasing production capacity in future years. Freeport Sulphur Company announced that it will produce 50,000,000 pounds of nickel annually from its deposits at Moa Bay, Cuba, and the French nickel company, Le Nickel, with mines on the island of New Caledonia, disclosed plans to increase its output to 50,000,000 pounds or more per year.

Based on these programs and the announced expansion plans of other producers, it is expected the annual total Free World producing capacity in 1961 will approximate between 650,000,000 and 675,000,000 pounds, with much of the increase government stimulated or sponsored. Included in the estimated 1961 total production capacity is the output of the United States government-owned plant at Nicaro, Cuba, which is understood to have increased its production facilities to 50,000,000 pounds annually, and also that of such Canadian producers as Falconbridge Nickel Mines Limited and Sherritt Gordon Mines Limited which have announced that they will increase their respective productions to 55,000,000 and 25,000,000 pounds annually.

In conclusion, barring any presently unforeseen large increases in defense demands, it is expected that there will be more nickel available to the industries of the Free World in the coming year than was the case in 1957. The supply-demand situation throughout the world in 1958 should be in close balance, although some supplies offered during the year will continue at premium prices.

# Copper, Lead, and Zinc in 1957

Capacity surges ahead of demand and industry applies brakes to production . . . . Long-range outlook is good . . . . Consumption will grow . . . . Research programs will develop new uses, slow substitution

## COPPER

One word describes copper's situation in 1957—overproduction. Yet when all factors are considered, copper still has a bright future. Many producers are banking on this, because they are increasing world-wide capacity by 32 percent in the next five years.

In the United States these conditions prevailed during 1957. Mine production of recoverable copper declined 3 percent from the 1956 total. Apparent consumption of refined copper for the first 11 months of the year was off 11 percent from the corresponding period in 1956. Import of copper in unmanufactured form for the first 11 months of 1957 was up 2 percent over the 1956 corresponding period. Exports during the first 11 months were up 75 percent. When 1957 opened, copper was priced at \$0.36 per pound. When the year closed, copper was priced at \$0.27 per pound. Producers' stocks of refined and blister copper and copper in process of refining were up 26 and 4 percent, respectively.

In assessing the copper picture in 1957, one should keep these points in mind. Copper output was exceeded only by the all-time high registered in 1956 and in the war years of 1942 and 1943. Another significant feature was the high rate of deliveries of copper to foreign fabricators in 1957. The foreign fabricators markedly increased their exports to the United States. In recent years the United States demand for fabricated products has been met almost entirely by domestic fabricators. During 1957, however, copper wire and copper and brass sheet and tube from European and Canadian mills entered the United States in substantial amounts. Thus the apparent consumption reported in the table may be lower than actual consumption of copper in the United States in 1957.

Still another bright spot is noted in the copper picture. According to one responsible company official, consumption rose on a world-wide basis; 1956 consumption was 3 percent above 1955; 1957 consumption was up 2 percent over 1956.

Most domestic producers curtailed production in order to bring supply and demand back in balance. During the year production cuts were announced by Phelps Dodge Corporation, The Anaconda Company, Inspiration Consolidated Copper Company, Miami Copper Company, Calumet & Hecla, Inc., Pima Mining Company, and Kennecott Copper Corporation. Most of the cutbacks were effected by reducing the work week and elimination of overtime. At year's end, cuts announced by the Big Three, Kennecott, Phelps Dodge, and Anaconda, at domestic properties amounted to roughly 9,700 tons per month. Total United States curtailment at the end of the year approximated 11,900 tons per month. The output from new mines and expanded facilities in the United States largely offset many of these cuts in 1957.

Elsewhere in the world, the Chilean Copper Department authorized a 10 percent reduction in output for 1958 based on

### Free World Copper Mine Capacity and Projected Increase for the Next 5 Years. Figures Reported in Thousands of Short Tons.

Year	USA		Outside USA		Total	
	Tons	Increase Over 1955	Tons	Increase Over 1955	Tons	Increase Over 1955
1955	1,014†		1,997†		2,982	
1956	1,130*	116	2,183*	186	3,313	302
1957	1,190	176	2,315	318	3,505	494
1958	1,226	212	2,391	394	3,617	606
1959	1,237	223	2,444	447	3,681	670
1960	1,244	230	2,578	581	3,822	811
1961	1,278	264	2,652	655	3,930	919
1962	1,278	264	2,666	669	3,944	933

† Copper & Brass Research Association estimate based on first 10 months  
\* American Bureau of Metal Statistics reports

\*\* American Bureau of Metal Statistics

### Preliminary Copper Industry Statistics for 1957

	1956	1957†
New Copper produced from domestic ores from Mines	1,106,215	1,076,922
Smelters	1,117,580	1,081,000
Refineries	1,080,207	1,046,000
New copper produced from foreign ores and mattes	362,426	404,000
Total new refined copper	1,442,633	1,450,000
Secondary copper	468,489	437,000
Imports (unmanufactured and refined)	787,492	696,573‡
Exports of (metallic and refined)	503,678	721,766‡
Stocks at end of year	339,000	370,000
Apparent consumption of new refined copper	1,367,000	1,250,000
Total refined copper (actual)	1,521,389§	1,249,000

1. Preliminary estimates by U.S. Bureau of Mines

2. January to November inclusive

1956 tonnage. Overall production of copper in Chile in 1956 was 452,000 metric tons. In 1957 copper output from the three American controlled mines in Chile amounted to 434,480 metric tons. It was reported that Union Minière du Haut Katanga initiated a 10 percent cut in production near the end of the year. This would amount to about 2,300 tons of copper per month. Plans to reduce production were announced by Roan Antelope Copper Mines, Ltd., and Mufulira Copper Mines, Ltd., in Northern Rhodesia. A similar announcement was also made by Cerro de Pasco Corporation.

Based on new or only recently completed expansion plans and new mine projects, the next 5 years will see a 12% percent growth in copper capacity over that available in 1957. This represents a whopping increase of 32 percent over 1955 capacity. Since 1955, expansion projects were scheduled at White Pine, Inspiration Consolidated Copper Company, The Anaconda Company at Butte, and Ray Mines Division of Kennecott Copper Corporation. In Canada, expansion projects were carried on at Campbell, Chibugamau, and Gaspe.

New mine projects are underway all over the world. In the United States Pima Mining Company reached production in 1957. Duvall Sulphur & Potash Company's new mine south of Tucson is scheduled for output early in 1959. In Canada new mine projects underway since 1955 included Willroy, Consolidated Sudbury, Tilt Cove, Heath Steele, Rainville, and Chicko.

In Chile, development is underway by The Anaconda Company on the El Salvador; the company's Africana mine was put into production in 1957. In Peru, a big development is underway at Toquepala by Southern Peru Copper Company. New mines are being developed in Europe in Ireland, and Yugoslavia.

Last year, a major producer estimated that presently developed and indicated reserves of copper in the Free World totaled approximately 165,000,000 tons of metal. If current world consumption is assumed to be 3,000,000 tons of copper per year, the Free World reserves represent a 55-year supply of copper. A breakdown of the reserves according to location are shown in a table accompanying this report.

What's the outlook for copper for the year ahead? A great deal depends on what the economy does. Opinions have been expressed by many responsible authorities that fabricators of copper products have been living off inventories for the past six to eight months. Administration and congressional efforts to spur the overall economy in 1958 should increase copper demand. With the cutbacks now in effect, any increase in demand should result in a substantial drop in industry stocks. One source cautiously said that the price of copper will rise in 1958. His prediction was based on industry efforts to balance supply and demand, and possible termination of the now-suspended copper import tax in June 1958. If Congress refuses to extend the duty-suspension, slated to end June 30, an import tax of \$0.017 per pound will become effective whenever copper is priced at \$0.24 per pound or over. If the average price of copper falls below \$0.24 per pound for a calendar month be-

tween now and June 30, a \$0.02 per pound duty becomes effective; the peril-point clause will remain in-force following June 30 unless changed by new legislation.

What kind of a price does the domestic producer want for his copper? Apparently the range is about \$0.30 per pound. Small copper producers are clamoring for the imposition of an increased import tax and a higher peril-point for copper. Bills have been introduced in both the House and Senate to establish a \$0.04 per pound tariff on the copper contained in copper-

bearing ores and concentrates whenever the price of the metal is below \$0.30 per pound.

Pervading opinion holds that an import tax, if granted, will help bolster the price. But one noted authority acidly commented, "The London Metal Exchange is an international currency gambling casino with nonferrous metals as chips. The minutes we withdraw support from foreign currencies, metal and ore will come in here (the U.S.) at almost any price differential."

## LEAD

There is no denying that 1957 was a hard year for lead. Production was down, imports soared, and consumption declined in the United States. One bright spot prevailed, however. Consumption of lead abroad during 1957 held at the high level of about 1,300,000 tons which had been reached in 1956. With all foreign nations striving for a better standard of living, this trend should continue.

A second important development was noted in 1957. This consisted of a cooperative agreement between domestic and foreign lead producers to undertake a broad, world-wide, joint research program. Though increased research will have no effect on the immediate outlook, the principle is fundamental to a healthy industry over the long-run.

Production of recoverable lead from domestic mines decreased to 333,500 tons in 1957, a decline of nearly 6 percent below the total registered in 1956. Running against this overall pattern were the states of Missouri and Idaho. Lead output was up 1 percent in Missouri and jumped 9 percent in Idaho. Arizona, Virginia, Colorado, and Washington also recorded increases.

Elsewhere in the United States production declines were noted. Output in Oklahoma was down 47 percent; Kansas production was off 44 percent; Montana output declined 29 percent; and Utah mines produced 11 percent less lead than in 1956.

The dominant factor in the lead market in 1957 was the United States government. It had been apparent for several years that a situation of top-heavy supply existed. The surplus failed to depress the market price due to the United States' military stockpile program and the barter of agricultural products which removed some of the excess production from normal trade channels. Both programs served to prop the price of lead.

Though the government continued stockpiling during 1957, the rate of procurement was considerably below the 1956 level. It has been estimated that 5,000 tons of lead each month was acquired for the military stockpile in 1957. In 1956, nearly twice as much lead went into the stockpile.

The surplus of lead was accentuated by the British government's announcement in January 1957, that it intended to dispose of 30,000 tons of lead from its strategic stocks. Though the disposal covered a 9-month period from March through November 1957, it added to the general condition of oversupply. In December 1957 the United Kingdom decided to dispose of another 20,000 tons of lead at a monthly rate of 1,200 tons.

In the meantime, imports of lead in pig, ore, and concentrates were pouring into the United States at a fast pace. It's estimated that 515,000 tons of lead was brought into the country in 1957. This represented an approximate increase of 7 percent over the 1956 period. The net result of world over-production, reduced domestic consumption, and a slower United States stockpiling rate was that lead stocks piled up in the hands of producers and consumers.

The domestic producers sought relief. The administration sent to Congress the long-range minerals program which incorporated sliding-scale import taxes for both lead and zinc. Congress failed to act on the proposal before it adjourned and tossed the problem back to the administration. In September the domestic producers, through the Emergency Lead-Zinc Committee petitioned the Tariff Commission for maximum permissible increase in tariff rates. In the case of pig lead, this would result in increasing the present tariff from 1 1/16 cents per pound to 2.55 cents per pound. The Emergency Lead-Zinc Committee also asked for the imposition of import quotas.

### Preliminary Lead Industry Statistics for 1957

	1956 (Tons)	1957 <sup>1</sup> (Tons)
United States mine production	352,800	334,000
Imports into U. S.	479,875	515,000
Production of secondary lead in U. S.	506,800	500,000
Foreign mine production	1,600,000	1,700,000
United States consumption of lead	1,209,717	1,145,000
Foreign consumption of lead	1,151,000	1,300,000

1. Estimates are based on levels attained in first 11 months and the extrapolated to full-year basis.

The domestic producer would like to see the price of lead stabilized at \$0.16 to \$0.17 per pound. When asked what prices they wanted for metals, the replies varied from a low of \$0.295 to a high of \$0.31 per pound combined lead-zinc.

In the United States, lead consumption during 1957 was slightly disappointing. Preliminary estimates place usage in 1957 6.5 percent below 1956. Lead lost ground to plastics and aluminum in one of its main markets—cable sheathing. The metal also suffered an approximate 9 percent decline in use for tetraethyl lead. This could be accounted for, in part, by lower gasoline consumption in 1957. What the effect of new catalytic cracking plants will be on lead consumption remains to be seen. These plants reportedly produce better gasoline which requires less tetraethyl lead. The use of lead in storage batteries showed a slight drop.

Based on an estimated domestic lead consumption of 1,125,000 tons per year, the Emergency Lead-Zinc Committee believes that annual imports of lead should be about 240,000 tons. This is less than half the metal imported during 1957. To maintain a healthy domestic industry, the Committee opinion is that United States mine production should contribute 385,000 tons yearly to lead consumers. The remaining 500,000 tons of lead for a 1,125,000-ton yearly consumption would normally be available from scrap says the Committee.

The outlook for lead in 1958 is shrouded with uncertainty. Production will be less due to the low price. This should exert some corrective influence on the basic problem of over-supply. The general level of the United States economy during the year will exert a powerful influence on the market. Most predictions are for more housing starts, and this could benefit consumption favorably. Industrial expansion will be down, however, and it follows that consumption of lead will be off in this field. Producers feel that the lead position will improve slightly by the end of the year.

One of the great unknowns regarding the lead market is the status of the United States government stockpiling program. Some industry observers expect stockpiling of lead to terminate at mid-year. Others think that up to 150,000 tons of lead will move into the stockpile. Estimates place the total lead now held in the stockpile in excess of 1,000,000 tons. It is no secret that the government is taking a long, hard look at the stockpile program. When will it end? Worse yet, will steps be taken to dispose of any of the material held in the stockpile?

One of the future bright spots for lead is an anticipated growing use of the metal abroad. Foreign consumption held up well in 1957. Lead has been mentioned prominently in applications for radiation shielding and for use in ceramics. Future growth in these fields hold considerable promise for increased consumption.

## ZINC

The American Zinc Institute called 1957 one of the better consuming years for the zinc industry. Best long-range news for the producer during 1957 was the growing recognition of the value of fundamental and applied research as a direct

approach for market expansion. The most important public announcement was the introduction of the widely heralded Long-Range Minerals Program. It was termed by some, "an insult to the industry"; it was hailed as a major victory by

others, due to administration recognition of the excise tax principle. Most important presentation of the year was the testimony of the Emergency Lead-Zinc Committee before the Tariff Commission.

Technically, the most important development of 1957 was the zinc blast furnace of Imperial Smelting Company at Avonmouth, England (reported in *MINING WORLD*, October 1957).

For the miner, troubled with foreign imports of zinc it was a hard year. When the year opened, the zinc price was \$0.135 per pound, East St. Louis, and domestic production was rolling along at a higher average rate than in 1956. By July the price had dropped to \$0.10 per pound; many mines were forced to close or curtail activities. When asked to predict zinc's price movement in 1958, one authority cautiously said he expected some increase. Another flatly stated the price would rise in the second quarter of 1958.

The zinc industry won't get any more help by government stockpiling. The Office of Defense Mobilization is closing the zinc stockpile at the end of April 1958.

Domestic mines produced 520,100 tons of recoverable zinc in 1957, according to the U. S. Bureau of Mines. There was a noticeable shift by area in the production pattern. Both New York and Tennessee registered all-time production highs in 1957. The combined zinc output of states east of the Mississippi showed an 11 percent gain over 1956. On the other hand, production from the Tri-State district dropped 47 percent under 1956 figures; this area was the largest producer in the United States for 60 years prior to 1950. Zinc output in the western states declined 5 percent in 1957 compared to 1956. This shift in area production is expected to continue. The reason is simple. New mine developments are scheduled in Tennessee, Pennsylvania, and Virginia. None are slated for the Tri-State or West at this time.

Ore output during the first four months of 1957 was greater than the 1956 average monthly production rate. In the last half of 1957, mine production dwindled to 228,500 tons, 22 percent less than the 291,600 tons produced in the first half of 1957.

Over-expansion of the world-wide zinc industry has been a major problem since the end of the Korean War. The effects of excess productive capacity had been damped by United States government acquisition of zinc for the military stockpile program and by exchange of agricultural products. In April of 1957 there were indications that federal officials were closely scrutinizing the stockpile program. The barter of agricultural products was temporarily suspended. Later barter was reinstated but on a sharply restricted basis. The net effect of these developments combined to break the market price.

The United States government continued military stockpiling of zinc. But Simon Strauss, vice president of American Smelting & Refining Company, publicly stated that the pace of these acquisitions in 1957 was far below 1956. His estimate: 20,000 tons of zinc moved into the military stockpile each month in 1956; and in 1957 only 10,000 tons monthly were acquired for stockpile. It is believed that the quantity of zinc in the stockpile is substantially in excess of the 300,000-ton goal originally established by President Eisenhower when he announced the program in 1954. It is commonly stated in the trade that the quantity of zinc in the stockpile tops 1,000,000 tons.

Both barter and stockpiling helped maintain the price of zinc during 1956 and in the early part of 1957, by taking some of the excess production off the market. But it was inevitable that stocks would begin piling up in producers' hands. A basic problem of the domestic zinc miner is that zinc ore can be mined and shipped to this country at a lower cost than the American producer can afford to operate. Solutions to the import question were sought. The administration took the lead in proposing a tariff increase to Congress. Congress, however, failed to act before adjournment.

In September 1957 the National Emergency Lead-Zinc Committee asked the Tariff Commission for relief under the escape clause of the Trade Agreements Extension Act.

It's a well known fact that zinc imports are needed in the

### Slab Zinc Consumption in Certain Countries in Tons<sup>1</sup>

Country	1956 Consumption Jan.-Sept. incl.	1957 Consumption Jan.-Sept. incl.	Percent Change 1957 vs 1956
United States	723,900	692,200	-4
Canada	43,600	37,400	-14
Mexico	12,300	12,900	+5
Denmark	3,200	4,200	+31
France	105,000	116,100	+10
Fed. Rep. of Germany	174,900	181,700	+4
Italy	42,000	56,300	+34
Netherlands	14,800	21,300	+44
Sweden	21,000	16,900	-20
Switzerland	7,900	6,400	+19
United Kingdom	188,800	192,000	+2
Australia	55,400	64,700	+17
India	29,600	33,400	+20
Total	1,422,400	1,440,500	+1

1. American Bureau of Metal Statistics.

### Preliminary Zinc Industry Statistics for 1957

	1956 (Tons)	1957 (Tons)	Percent Change 1957 vs 1956
Mine production <sup>1,2</sup>	542,340	520,128	-4
Slab zinc production <sup>1,2</sup>	1,062,954	1,057,450	- $\frac{1}{2}$
Total slab shipments <sup>1,2</sup>	1,035,311	959,568	-8
Shipments domestic <sup>1,2</sup>	869,270	765,132	-12
Shipments gov't Accts. <sup>1,2</sup>	157,014	179,466	+14
Shipments export <sup>1,2</sup>	9,027	14,970	+66
Stocks at smelters <sup>1,2</sup>	68,622	166,655	+142
Stocks at consumers <sup>1,2</sup>	93,896	72,111	-23
Consumption <sup>1,2</sup>	818,601	780,047	-5

1. U. S. Bureau of Mines. 2. American Zinc Institute, Inc. 3. Full year.

4. December 31. 5. October 31. 6. January to October.

United States. This country simply can't produce all of the metal that it needs. The Emergency Lead-Zinc Committee generally agreed that the following levels were necessary to sustain a healthy domestic zinc industry: Production of zinc contained in newly mined ore—600,000 tons annually; production of zinc from secondary metal—100,000 tons per year; required imports of zinc in metal or ore—400,000 tons per year. These estimates are based on a domestic consumption of 1,100,000 tons of zinc per year in the United States.

In presenting the industry case to the Tariff Commission, the Emergency Lead-Zinc asked for maximum tariff relief under existing laws and for the imposition of import quotas on zinc contained in ore, concentrate, pig, slab, and in manufactured or semi-finished products. The Tariff Commission rejected arguments favoring import quotas for zinc in semi-finished or finished products. It heard only testimony regarding quotas for ore, concentrate, and slab.

The maximum relief now available to the zinc industry under existing law is an increase of the tariff on slab zinc to \$0.021 per pound. The current tariff now applicable to slab zinc is \$0.007 per pound.

What about zinc's future and what will be the long-range pattern? Examination of past consumption records show that historically zinc consumption curves have followed peaks and valleys. There is little evidence to indicate that the years of 1956 and 1957 were not normal consuming years, says the American Zinc Institute. Slab zinc consumption in the United States, Canada, and Sweden was down slightly. Consumption in Europe, Mexico, Australia, and India was considerably higher in 1957 based on preliminary estimates. It is interesting to note that overall consumption of zinc during 1957 was 1 percent higher in the 13 countries shown in Table No. 2.

In the United States, estimated slab zinc consumption for 1957 was 936,000 tons, down 7 percent from the 1,008,790 tons consumed in 1956. For the first time in history, consumption of zinc for die casting exceeded the zinc consumed for galvanizing purposes. A big drop in the use of zinc for galvanizing was noted during 1957. There is little data, however, to indicate that substitution of competitive steel-coating processes was responsible for the drop. Nor was the drop in galvanizing accounted for by decreased steel production. It can only be assumed that the relatively small use of zinc for galvanizing which prevailed in 1957 is only, therefore, a temporary situation.

With a situation of over-supply and a slight reduction in consumption prevailing in the United States, stocks of zinc in producers' hands grew during the year. At the beginning of 1957, producers held 68,622 tons of zinc; at the end of the year, this figure had grown to 166,655 tons.

The zinc industry, through the American Zinc Institute, is currently in the process of arranging for a major expansion in research activities. The program is aimed at the consolidation and expansion of existing markets and the discovery of new ones. A staff is being formed to supervise the program. The next step, according to the American Zinc Institute, will be the broad placement of research and development projects in research centers, universities, and engineering schools.

What about the long term outlook for zinc? Two factors combine to make future growth in the industry look attractive. Over the long run consumption of zinc has steadily grown. In the United States the increasing population trend should promote further increase in zinc consumption. Abroad, both population growth and per capita consumption of zinc are expected to grow. A steadily increasing drive by under developed nations to increase living standards is taking place. Any increase in living standard is bound to result in increased use of zinc, and all other metals for that matter. One official said that zinc consumption will increase about 5 percent a year in the United States. He expected foreign consumption to show an even greater growth.

The outlook for 1958 is closely tied to the general level of industrial activity which will prevail. If this is true it appears that use of zinc during the first half of the year will be slightly lower than in the last half of 1957. Prevailing economic predictions are for an upturn in the economy in the second half of 1958. It follows that zinc consumption should show a gain in the last half of 1958 if the predictions hold true.

One thing is certain. At current price levels zinc is a cheap raw material in comparison to potential competing substances. The price will sooner or later influence consumption.

## PERLITE

### "A new record in 1957 as perlite became the nation's most popular plaster aggregate"

RICHARD J. O'HEIR,  
Secretary-Treasurer, Perlite  
Institute, New York, New  
York.

Sales of expanded perlite—the white, ultra-lightweight aggregate that is replacing heavier sand in plaster and is being used increasingly in insulating concrete—are estimated to have held firm in 1957 with a dollar volume of \$13,200,000. The sustained level of perlite sales was achieved in spite of a decline in the building materials industry. Output of the expanded volcanic lava, produced by 84 plants of 72 companies in 30 states, also maintained a level of 260,000 short tons.

Perlite mines are operated by 12 companies in California, Nevada, Colorado, New Mexico, Oregon, and Arizona.

Foreign countries are also showing increasing interest in developing their perlite resources. As evidence of this, the Perlite Institute has member companies in Canada, Mexico, Venezuela, Germany, Great Britain, Greece, Japan, Australia and New Zealand, and expects to add to this list in 1958.

A new record was set in 1957 as perlite became the nation's most popular plaster aggregate. Latest statistics show that 53 percent of all plaster applied in the United States used perlite as the aggregate, compared with 44 percent in 1955.

For 1958, perlite sales will hold their 1957 level since only slight increases in public and private construction are expected and 85 percent of perlite sales are to the building industry. There are, however, several strong trends indicating highly favorable long-term growth prospects for the perlite industry, he notes.

First, there is a steadily rising demand by nurseries and home gardeners for perlite as a soil conditioner and as a

plant rooting and shipping medium. This represents a fairly new field for perlite, with a vast sales potential indicated. Continuing university research programs are expected to result in more extensive horticultural uses.

A second trend is the ever-continuing use of perlite plaster which provides greater fire resistance and better insulation with less than half the weight of sand plaster.

Third, there is a greater demand for perlite insulating concrete, particularly for light structural roof deck constructions where it adds insulation and fire safety and reduces dead loads. Other important perlite concrete applications include insulation under radiant floor heating systems, lightweight floor fills in multiple story buildings, and for curtain wall back-up systems.

Fourth, increases are also expected in the use of perlite as a component of acoustical plaster and tile, insulation board, precast concrete sections, and other manufactured products.

#### Growth of the United States Perlite Industry From 1947 Through 1957

Year	Crude Perlite Sold and Used by Crude Producers Short Tons	Crude Perlite Sold Value	Expanded Perlite Sold Short Tons	Expanded Perlite Sold Value
1947 <sup>1</sup>	10,450	\$ 58,000	7,700	\$ 271,000
1948 <sup>1</sup>	22,100	134,000	18,600	742,000
1949 <sup>1</sup>	71,100	510,000	52,200	2,385,000
1950 <sup>1</sup>	101,536	649,162	86,962	4,471,383
1951 <sup>1</sup>	153,502	858,099	133,175	7,243,298
1952 <sup>1</sup>	164,845	873,054	154,503	7,997,731
1953 <sup>1</sup>	198,751	1,439,658	174,461	8,894,735
1954 <sup>1</sup>	219,703	1,762,100	195,499	10,278,745
1955 <sup>1</sup>	286,157	2,281,632	246,343	12,585,297
1956 <sup>a</sup>	307,000	2,490,000	265,000	13,382,000
1957 <sup>b</sup>	307,000	2,500,000	260,000	13,200,000

1. Figures from U.S. Bureau of Mines, Mineral Industry Survey.

2. Estimate of Perlite Institute.

## PHOSPHATE

### "The phosphate industry will continue to show a moderately steady growth in the future"

G. DONALD EMIGH  
Director of Mining, Monsanto Chemical Company, St. Louis, Missouri

World production of phosphate high-grade rock and concentrates for 1957 is about 30,000,000 long tons—down perhaps 1,000,000 tons from 1956. Notable among new production outside the United States was the start of a mining and milling operation at Recife, Brazil, which will produce over 200,000 tons a year. Operations in Morocco were relatively steady after the concern of a year or two ago that the Moroccans might remove the French operators of the nationalized mines. In Baja California, Mexico, the M. A. Hanna Company is reported to be proceeding actively with the development of low-grade deposits.

United States production was about 15,400,000 long tons. This is about the same as 1956—being either up or down 5 percent depending on the source of figures used. The 10 years prior to 1957 show a yearly increase of 7 percent. Adverse weather conditions early in the year, coupled with the general declining economy late in the year, had an adverse effect on fertilizer sales. The elemental phosphorus industry was not affected to the same extent with a modern decrease in the West and an increase in Tennessee.

The phosphate industry will continue to show a moderately steady growth in the future. Florida will continue its dominance as a producer, and probably increase its proportion of production. Largely because of its adverse location freight-wise, the West, for some years at least, will probably slip proportionately in production.

The year saw publicized a new phosphate field in Beaufort County, North Carolina. Several companies have been looking into the field with Bear Creek Mining Company most active to date. Mineability of the phosphate sands is one of the major problems to be resolved.

Estimated production in long tons by fields was: Florida, 11,300,000; West, 2,000,000; Tennessee, 2,100,000.

Following are highlights of 1957 phosphate mining operations in the United States:

**FLORIDA:** American Agricultural Chemical Company operated its South Pierce and Boyette mines and plants.

American Cyanamid Company shut down Saddle Creek mine and started Orange Park. Operations continue at the Sidney mine. The company in May started the new triple superphosphate plant at Brewster.

Armour Fertilizer Works completed its second year of mining operations at its new Bartow mine.

Coronet Phosphate Company, a division of Smith-Douglas Company, operated its Tenoroc mine at Lakeland. Their potassium silicofluoride facilities were enlarged.

Davison Chemical Company, a division of W. R. Grace & Company, operated the Pauway and Bonnie mines. Swift & Company operated the Varn and Watson mines. International Minerals & Chemical Corporation shut down the Peace Valley mine and operated the Achan and Noralyn mines. At its Bonnie plant sulfuric acid facilities were doubled. Kaiser Aluminum and Chemical Company is taking the fluoride waste material.

Virginia-Carolina Chemical Corporation operated the Homeland and Clear Springs mines. They started shipments of fluoride waste from the fertilizer plant to Kaiser Aluminum and Chemical's plant at Mulberry.

**TENNESSEE:** 93 percent of Tennessee phosphate rock production goes into the electric furnace industry. The three furnace operators are Shea Chemical Company, Victor Chemical Works, and Monsanto Chemical Company. There were no major changes in their facilities but some increase in capacity.

International Minerals & Chemical Corporation operated at Wales producing rock for direct application and as electric furnace feed. The firm's Mt. Pleasant and Godwin facilities were largely inactive.

Virginia-Carolina Chemical Corporation operated its Mt. Pleasant mine and fertilizer plant.

**WEST:** Slightly over half of western rock production went into the electric furnace industry.

Montana Phosphate Products Company continued surface and underground operations at the Anderson mine near Garrison, Montana. There was limited production from the Luke mine. The Relyea underground mine near Garrison, Montana, operated most of the year.

Victor Chemical Works operated its underground Canyon Creek and Maiden Rock (Anderson) mines located south of its electric furnace plant at Silver Bow, Montana.

J. R. Simplot Company conducted summer open-pit mining operations at the new Centennial mine located on the Idaho-Montana line. Production goes to Canada and was increased over 1956. This company also operated its open-pit Gay mine near Pocatello, Idaho, shipping rock to its own fertilizer plant at Pocatello, and to Westvaco Mineral Products Division of Food Machinery and Chemical Corporation's electric furnace plant at Pocatello.

Monsanto Chemical Company conducted summer open-pit operations as its Ballard mine near Soda Springs, Idaho. The rock is trucked to its electric furnace plant at Soda Springs.

During the summer The Anaconda Company mined open-pit at its Conda mine near Soda Springs. The ore was milled and concentrates shipped to the fertilizer plant at Anaconda, Montana.

San Francisco Chemical Company carried on summer open-pit mining operations at the Waterloo mine near Montpelier, Idaho. The company continued mining operations at its Leef mine near Sage Junction, Wyoming. A new wet beneficiation plant was placed in operation there in the fall. Underground operations were also carried on by the company in the Crawford Mountains of Utah at the Arikaree and Cherokee mines. The company continued development work on phosphate near Vernal, Utah.

Central Farmers Fertilizer Company, a mid-western co-operative, began construction of an electric furnace plant in Georgetown Canyon. Development also started on open-pit mining facilities near the plant.



## POTASH

### "All indications point to a continuing increase in demand for potash, both at home and abroad"

NELSON C. WHITE  
Vice President, Potash Division,  
International Minerals & Chemical Corporation,  
Chicago, Illinois

Potash industry results for 1957 might be summarized as so many others have been—a good year but marked by a sharp down-turn in the last quarter. A more detailed study marks it as differing considerably from the pattern of the recent past and so mixed as to make predictions for the future, at least the short-term future, more difficult than usual. Reactions in the world market affected imports and exports with resulting effects on domestic business. Farm legislation, the general farm economy, and over-all economic pressures had their effects, with the last item probably the dominant one during the last quarter. A new pricing system was introduced by one producer in an attempt to prevent peaking of shipments in the early spring and a subsequent flurry in prices finally stabilized at a lower level.

Production in 1957 by United States producers continued to increase over previous years. 2,300,000 tons of K<sub>2</sub>O were produced—a figure 6 percent above last year's totals. Deliveries by United States producers also increased over 1956, totalling 2,141,000 tons K<sub>2</sub>O, an increase of 2 percent. Some 208,000 tons of K<sub>2</sub>O were exported mainly to the Far East and South America. North American consumption of potash totalled 2,140,000 tons—about equal to the total shipments of the domestic producers, with imports from Europe just about balancing exports by domestic producers.

In spite of further reductions in farm acreage and a slight decrease in real farm income during the year, the use of potash in fertilizer manufacture equalled last year's tonnage. During the last quarter raw materials backed up in the plants of the primary producers. Since the trend to a more seasonal shipping season has been accelerating over the past several years, one producer introduced a new pricing schedule at the start of the contract season which offered inducements for off-peak shipments. Variations of the original schedule were offered by other producers and prices were fluid for a period of several weeks in June and July. They finally stabilized some

3 percent below 1956 levels but also included a differential in prices between coarse and regular forms of muriate, a return to a practice discontinued several years ago.

A substantial increase in available production occurred with the start of operation of National Potash Company's Carlsbad, New Mexico, plant in January. The older United States producers in the Carlsbad district—Potash Company of America, Duval Sulphur and Potash Company, International Minerals & Chemical Corporation, Southwest Potash Company, and United States Borax and Chemical Corporation—together with Bonneville, Ltd. at Wendover, Utah concentrated their efforts on improving operating efficiencies and their ability to produce more of the coarse sizes of muriate. Farm Chemical Resources Development Corporation completed a shaft near Carlsbad near the end of the year. They are now doing development on ore processing and design on the balance of the plant. In Canada, Potash Company of America carried its shaft to a depth of approximately 2,400 feet and was well started on the construction of a refinery and other surface facilities by the end of the year. Completion of the project is scheduled for late 1958. International Minerals & Chemical Corporation let contracts for the sinking of a shaft and construction of refinery at Esterhazy. 300 feet of shaft had been sunk by the end of the year and some surface installations built. Completion is scheduled for late 1959.

The long-term future of North American potash (Canada included) is relatively safe to predict. All indications point to a continuing increase in demand for potash, both at home and abroad. Most sources agree that this increase will average 5 percent annually. The quality of the American deposits and the demonstrated efficiencies of the domestic producers should enable them to improve their position in the world market. Though the trend may be a relatively straight line, the year by year actuals will, of course, vary from it. The past year saw some sharp competition for export business between European producers, resulting in lowered prices in some parts of the world supplied by them. Russian production is also appearing in world markets at very low indicated barter deal prices. The short-term effects of these and other factors make predictions for next year rather difficult. It does, however, seem safe to assume that, barring an unexpected decline in the economy, 1958 should match 1957 in both production and shipments.

## RARE AND MINOR METALS

### "Rockets, jets and nuclear energy spur new interest in many relatively obscure metals"

Our rapidly expanding scientific frontiers are pushing specifications for alloys beyond limits now attainable with conventional materials. A great drive is on to develop new alloys to meet the requirements of nuclear energy and the space age. Industry is responding by making available ultra-pure metals. The techniques of vacuum metallurgy, zone melting, arc refining, and ion exchange are yielding metals where impurities are measured in parts per million. The pure elements are showing surprising and unpredicted properties. It is to many of the little known elements, now available for the first time in pure form, that science is turning in the quest for better materials.

BISMUTH is being examined for possible application as a liquid-metal, reactor coolant in the atomic energy field. Its low melting point and high boiling point make it look attractive from this standpoint. Most other uses of bismuth depend on a couple of unique characteristics. It expands on freezing and shows very little shrinkage on cooling. These properties are modified by alloying constituents. Some bismuth alloys containing lead, expand on freezing and grow during and after cooling to room temperature.

Preliminary data indicates consumption of bismuth was about 1,600,000 pounds in 1957, about 8 percent above 1956. Total world production was estimated at 4,800,000 pounds in 1957. Nearly 25 percent of domestic bismuth consumption was in pharmaceuticals and most of the remainder was used in fuse metal, solder, and other alloys. Spokesmen from Cerro de Pasco Corporation say the outlook for bismuth alloys is bright. The company has sufficiently large resources of bismuth in Peru to make it a major producer. In connection with atomic energy, some of the anticipated future need for bismuth will be for metal of high purity. Even Cerro de Pasco bismuth, which contains less than 15 parts per million total impurities, is not considered sufficiently free of contaminants for these purposes.

CADMIUM has important nuclear applications due to its ability to absorb neutrons. An interesting product developed during the year is a nickel-cadmium miniature battery. Its outstanding feature is that it can be recharged. If properly designed into the circuit, the nickel-cadmium button cell can be recharged by plugging the unit into a standard wall outlet.

Production of cadmium metal in the United States during 1957 amounted to about 10,540,000 pounds. Most of it was recovered from zinc smelting operations or from imported Mexican, cadmium-bearing, flue dust.

COLUMBIUM-TANTALUM received a great deal of attention in 1957. Heretofore, commercial use of columbium was primarily confined to application as a carbide stabilizer in stainless steels. Now it is being examined for a whole range of high temperature alloys—2,500 to 3,000° F. range. Among its desirable properties are good tensile strength at high temperatures and high corrosion resistance. Potential applications of this metal are being rapidly advanced by the availability of columbium of extreme high purity in commercial quantities.

In atomic energy, columbium is interesting because of its low neutron cross section; it does not suffer radiation damage.

At the present time over 99 percent of United States production of columbite-tantalite concentrates originate from Porter Bros. Corporation's dredging operation at Bear Valley, Idaho. Production from domestic pegmatites was insignificant in 1957. Reliable production statistics are lacking. In 1956, world production of columbium-tantalum amounted to about 9,640,000 pounds of which 80 percent came from Africa. Nigeria supplied nearly 60 percent of the output. In 1957 it is estimated that Nigeria produced about 1,750 tons of columbite, which represents a substantial reduction from 1956 output.

In 1956 the United States government terminated a purchase program for columbium-tantalum concentrate. The sudden end of government purchases, caught the industry with capacity well in excess of demand. So little was known of the two metals that they have been thought of as rare in occurrence. But in reality large reserves exist—mainly on foreign soil. One authority last year said that actual reserves in North America are in excess of the total combined known reserves of nickel and molybdenum. Most of these reserves are in Canada; the only domestic source now worked is the Bear Valley, Idaho operation. Large reserves of pyrochlore are known to exist in Africa, Brazil, and Norway. Present Nigerian production is obtained as a by-product from tin mining.

RARE EARTHS were mined in the United States at Molybdenum Corporation of America's bastnaesite deposit at Mountain Pass, California. Rare earths were also recovered as by-products from the South Carolina ilmenite-rutile operation of Heavy Minerals Company, and from the euxenite-columbite dredging operations of Porter Bros. Corporation at Bear Valley, Idaho. Monazite, imported from South Africa, was the primary source of rare earth raw materials and thorium production in the United States in 1957.

It was reported that total annual sales of rare earth chemicals are in the vicinity of \$10,000,000. Three firms dominate production of metals and chemicals, but several others are actively investigating production possibilities. Processors of ores or concentrates last year included Lindsay Chemical Company, Heavy Minerals Company, Davison Chemical Company and Mallinckrodt Chemical Works.

Gadolinium, samarium, and europium salts have a high nuclear cross-section and absorb neutrons. The thermal neutron cross sections for these materials are said to be higher than cadmium, boron, and hafnium, which have been used widely in reactor-control components.

Supply of rare earths certainly doesn't represent a problem; they are abundantly available all over the world. The major problem is development of markets to support potential production facilities.

SEMI-CONDUCTORS include selenium, germanium, and silicon. Until 1956, selenium was in critically short supply, but this was not the case in 1957. Last year was characterized by high production and a sharp decline in consumption. Major use of selenium is in rectifiers, and here it lost ground to both germanium and silicon. Selenium price at the start of 1957 was quoted at \$12.00 per pound for commercial grade and \$15.00 per pound for high-purity grade. At the end of the year the prices had dropped to \$7.50 and \$10.50 respectively, for the two grades.

Interest grew in super-pure silicon last year for semi-conductor applications. Domestic production last year was estimated at about 30,000 pounds, with DuPont accounting for the major proportion. W. R. Grace & Company announced that it was teaming up with the French firm, Pechiney, to produce ultra-pure silicon. Aries Laboratories of New York announced a new process for producing ultra-pure silicon.

Germanium, largely recovered as a by-product from Tri-State zinc ores, continued to score gains in the electronic industry.

MAGNESIUM production hit a peace-time high in 1957. Total output for the year was estimated at about 80,000 tons, close to industry capacity of 82,000 tons annually. Consumption was down in 1957 as a result of decreasing military aircraft programs.

All domestic production was obtained from 3 plants; two were operated by Dow Chemical Company where magnesium was recovered from sea water. Nelco Metals, Inc. operated the third primary plant at Canaan, Connecticut, where a silicon-thermic process is used.

ZIRCONIUM expansion continued in 1957. Stimulated by contractual commitments with the Atomic Energy Commission, producers boosted output from about 470,000 pounds in 1956 to something over 2,000,000 pounds in 1957. The trend will continue in 1958, when additional new facilities will be completed or reach peak capacity.

Here is a brief review of activities. Carborundum Company, pioneer producer, operated the 325,000-pound (annual capacity) plant at Akron, New York; it completed a 1,200,000-pound capacity plant in West Virginia. Wah Chang Corporation turned out about 300,000 pounds of sponge at facilities in Albany, Oregon, leased from the United States Bureau of Mines. It completed a second plant at Albany in March 1957; this was initially rated at 300,000 pounds per year, but has since been expanded to nearly 500,000 pounds per year.

Most interest in the metal centers on hafnium-free zirconium. It has a low neutron cross section (absorbs few neutrons) which makes it useful in atomic reactor construction, and as a cladding element for reactor fuels. Non-nuclear applications of zirconium are expected to grow too. One authority predicted a non-nuclear consumption of 500 tons of zirconium within the next 5 years.

PLATINUM situation changed in 1957. In last year's Cata-

log, Survey & Directory edition we reported demand was brisk in 1956. In 1957, production mounted and demand fell-off somewhat. The result was a decline in price from \$103 to \$105

per ounce to \$77.00 to \$80.00 per ounce at the end of the year. The major market continued to be oil refining where platinum is used as a catalyst in making high-octane gasoline.



Ross D. LEISK  
Consulting Mining Engineer,  
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The statistical data presented below involve some degree of approximation due to the fact that official figures on production, consumption, and imports are incomplete for December and due also to the fact that substantial quantities of Lend Lease silver returned, or in process of being returned, in the latter part of 1957 had not been credited on the books of the United States Treasury Department when year end balances were struck on December 31st. Adjustments have been made, by estimate, to bring all data to a December 31st closing date, and while final figures will vary somewhat from those used, the deviations will not be sufficient to alter any conclusions drawn as to indicated trends.

Production of silver in the United States in 1957 is estimated at 37,895,336 ounces, compared with a final figure of 38,700,000 ounces in 1956. Western Hemisphere production is estimated at 145,000,000 ounces as compared with 145,800,000 ounces in 1956. Production outside of the Western Hemisphere is estimated at 78,000,000 ounces compared with 76,600,000 ounces in 1956, making a total estimated world production for 1957 of 223,000,000 ounces compared with 222,400,000 ounces for 1956.

World consumption of silver in the arts and industries is estimated at 210,000,000 ounces compared with 211,500,000 ounces in 1956. The usage in the arts and industries in the United States was 95,000,000 ounces, a decline of 5,000,000 ounces from 1956, but this was largely offset by an increase of 4,200,000 ounces in West Germany in 1957. It is of particular interest to note that there has been a steady rise in consumption of silver in the arts and industries in West Germany from 1953, when 11,900,000 ounces were used, to 1957 when the quantity consumed was 45,000,000 ounces. This puts West Germany in second place as a consumer of silver by a wide margin.

World consumption of silver for coinage purposes, exclusive of the United States, is estimated at 28,000,000 ounces in 1957 compared with 30,000,000 ounces in 1956. United States coinage requirements amounting to 51,400,000 ounces in 1957 and 31,100,000 ounces in 1956 are excluded from the comparison because these requirements are met by withdrawals from Treasury stocks of unpledged silver bullion and have no impact on the market. The combined consumption, arts, industries and coinage, exclusive of United States coinage, therefore, was 238,000,000 ounces in 1957 compared with 241,500,000 ounces in 1956.

If the world production totals for 1957 and 1956 are reduced by the amounts of newly mined domestic production delivered to the United States Treasury, namely an estimated 7,000,000 ounces in 1957 and 15,600,000 ounces in 1956, the effective world production available to the market becomes 216,000,000 ounces in 1957, and 206,800,000 ounces in 1956, so that the excess of world consumption, exclusive of United States coinage, appears to have been 22,000,000 ounces in 1957 and 34,700,000 ounces in 1956. Such a condition inevitably puts upward pressure on open market prices because it means that the excess silver must be obtained from other than current productive sources. The sources available are secondary, or reclaimed silver, reserves of demonetized coin held by foreign governments, current production of United States mines after the price passes 90.5¢ per ounce, and finally United States Treasury stocks of "free silver" in practically unlimited quantities after the price reaches the equivalent of 91.0¢ per ounce f.o.b. San Francisco, California mint. While the Treasury "free silver" is not available for export, its sale to United States industry has the effect of releasing other silver to meet the demands of the world market.

As might be expected the conditions set forth above con-

## SILVER

### "Domestic producers are well aware of the ceiling price effect of Treasury sales to industry"

tribute to a very stable market and a narrow bracket of price fluctuation. Sellers of silver hold out for prices very close to 90.5¢. If demand pushes the price above 90.5¢, it becomes advantageous for United States mines to sell on the open market, instead of to the Treasury. If the addition of domestic mine production does not satisfy demand and the price edges past 91.0¢, the "free silver" spigot at the Treasury opens more or less automatically and this effectively quenches any further rise in price. Then, with demand temporarily satisfied by Treasury silver, the price tends to decline. If it falls below 90.5¢, domestic mine production is no longer offered on the open market, and as soon as this creates a shortage, the cycle starts over again. The published price in New York in 1957 ranged between a high of 91 1/2¢ early in the year, and a low of 89 1/2¢ in mid December. The price range in 1956 was between 91 1/2¢ high, and 90¢ low.

The Treasury stocks of "Free Silver Bullion" were reported to be 127,400,000 ounces on December 31, 1957, a gain of 40,000,000 ounces from December 31, 1956. The increase represents Lend Lease silver credited, together with seigniorage and some minor acquisitions, reduced by 48,100,000 ounces used for subsidiary coinage and 3,800,000 ounces sold to industry. An estimated 180,000,000 ounces of Lend Lease silver was in process of being returned but not yet credited, leaving a balance of 22,300,000 ounces due from Saudi Arabia and 5,400,000 ounces due from Ethiopia. The due date for return of Lend Lease silver from these two countries has been extended to April, 1959.

The potential reserve of "free silver" available to the Treasury as of December 31, 1957 including the 27,700,000 ounces due in April, 1959 appears to be about 338,000,000 ounces. As long as this reserve is available to domestic consumers at 91¢ per ounce f.o.b. San Francisco mint which is equivalent to 92 1/2¢ New York, the price cannot be expected to rise above this figure. While the reserve is large, it will eventually be used up and when it is gone, the Treasury will have to buy silver on the open market to meet requirements for subsidiary coinage. It is logical to assume that the cost of replenishing Treasury reserves will be well above 91¢ per ounce and this raises a question as to whether it is in the public interest for the Treasury to continue selling to industry at 91¢.

Prior to the Act of July 31, 1946 the Treasury could not sell silver from the general fund for less than its coinage value of \$1.2929 per ounce. Due to wartime disruptions and restrictions, silver consumers had experienced difficulty in obtaining enough silver to meet their needs during the 1941-1946 period, and the 1946 Act provided relief from this situation by authorizing the Secretary of the Treasury to sell silver held in the Treasury's general fund at such prices as in his discretion he might determine, but not less than 90 1/2¢ per ounce. When the initial price of 91¢ was set by the Treasury it was about 10¢ per ounce higher than the world market price. Domestic producers feel that the intent of the 1946 Act would have been better served if the Secretary of the Treasury had used his discretionary authority to maintain a substantial differential in the Treasury selling price over the open market price. Domestic producers have become increasingly aware of the ceiling price effect of Treasury sales to industry and late in November one major producing organization prepared an excellent memorandum on this subject for submission to the Secretary of the Treasury.

There was no new silver legislation in 1957. The usual bills calling for repeal of all silver purchase legislation were introduced in the house and senate but were not reported out of committee.

In summary there were no significant changes in production or consumption of silver from the previous year. Price patterns were essentially unchanged and the very narrow range of fluctuation of the past two years may be expected to continue for a long time in the future unless the Treasury's pricing policy on sales to industry is changed or unless the authority of the Treasury to deplete its reserves of "free silver" is removed by legislative action.

## SULPHUR



### "Three new Frasch mines were under development: one in Texas and two in Louisiana"

A. J. DICKINSON  
Vice President, Freeport  
Sulphur Company, New  
York, New York

Not since the years of shortage in 1951 and 1952 has the United States sulphur industry received as much attention from the press as it did in 1957, a year marked by increased competition, price reductions, a dip in both demand and production, and construction of new productive facilities.

In 1957 the leveling off in the steel, fertilizer, paper, rayon, and other industries resulted in a small decline in the use of sulphur, although consumption nevertheless held at near-record heights. On the basis of preliminary figures, consumption of sulphur in all forms in the United States was down between three and four percentage points from the high of 5,780,000 long tons consumed in 1956.

The production of sulphur from all sources in this country was estimated at approximately 6,900,000 tons, compared with 7,820,000 tons in 1956. Sulphur mined by the Frasch hot water process from the mines in Louisiana and Texas accounted for an estimated 5,500,000 tons. Of the remainder, 525,000 tons represented elemental sulphur recovered from gases, 425,000 tons sulphur contained in pyrite, and 450,000 tons sulphur in other forms. In addition, the domestic supply was augmented by about 640,000 tons of sulphur in various forms imported from Mexico and Canada.

The Mexican sulphur had for some time been offered at substantially under the United States price scale. To meet competitive conditions, Texas Gulf Sulphur Company in September announced a decrease of \$3.00 a ton in its prices and

this move was followed by similar action by other domestic producers. The new prices of U. S. Frasch sulphur were quoted at \$25.00 a ton f.o.b. port for bright sulphur and \$24.00 a ton for the dark product. Trade publications later published lower price quotations for Mexican sulphur but subsequently they announced an increase in Mexican prices to \$24.00 a ton f.o.b. port for the filtered dark product and \$23.00 a ton for unfiltered.

Texas Gulf Sulphur remained the largest producer, operating Boling dome and two other mines in Texas. Freeport Sulphur Company, the second largest, produced from four mines in Louisiana, while Jefferson Lake Sulphur Company worked two in Texas and one in Louisiana, and Duval Sulphur and Potash Company mined one deposit in Texas. A 12th mine, the Damon property of Standard Sulphur Company in Texas, was closed down in April 1957.

Three new Frasch mines were under development: one in Texas and two in Louisiana. The Fannet, Texas, plant of Texas Gulf Sulphur was completed and production was scheduled to begin early in 1958. In Louisiana, Freeport began construction of its Lake Pelto and Grand Island projects. Grand Isle ranks as a discovery of major magnitude and it will mark the first completely offshore sulphur mine ever undertaken. Located in the Gulf of Mexico in 45 feet of water six miles from the nearest land, it will incorporate many unique features designed to make it one of the industry's most efficient operations.

Eight new plans to obtain sulphur from other than salt dome deposits were completed or under construction during the year, and productive capacity of three existing facilities was being expanded. The total new productive capacity of these projects, including those not yet completed, is estimated at about 275,000 tons annually.

## TIN



### "It appears probable that 1958 Tin consumption in the United States will be above 50,000 tons"

R. M. MACINTOSH  
Manager, Tin Research Institute, Inc., Columbus, Ohio

The tin mining industry in 1957 maintained stable conditions with slightly lower world mine production which was matched by a moderate drop in consumption. The two major producing areas, Malaya and Indonesia, showed about the same percentage decrease bringing them more in line with production a year or two ago.

According to estimates by the International Tin Council, the Soviet Union exported between 8,000 and 9,000 tons of tin. It has since been established that the Russian tin does not meet the standards of Grade A tin and that most of the tin found a market in Europe.

Consumption of tin throughout the world in 1957 suffered

#### World Tin Mine Production in Long Tons by Countries From 1954 Through 1957

Country	1954	1955	1956	1957
Malaya	60,691	61,245	62,295	59,293
Indonesia	35,861	33,368	31,874	27,725
Bolivia	28,824	27,920	26,849	26,550
Belgian Congo	15,084	15,208	14,533	13,449
Thailand	9,776	10,970	11,723	13,310
Nigeria	7,927	8,159	9,054	9,745
Others		20,130	18,172	20,900
Total World	158,163	177,000	174,500	170,972

to some extent from the declining activity in many parts of the economy in the United States in the last quarter of the year. This decline, as far as tin was concerned, was not as depressing as had been forecast in some quarters.

One significant change in ore handling is promised for 1958. Arrangements have been made to smelt Indonesian tin concentrates at the Texas City, Texas, smelter which was acquired by the Wah Chang Corporation from the federal government one year ago. The furnaces have been rebuilt and sufficient capacity is available to handle a considerable tonnage of concentrates. This action will be welcomed by many people who believe it is in this country's interest to maintain a tin smelter in operating condition.

In view of the supply and demand picture, the International Tin Council, acting under the International Tin Agreement, has imposed export quotas on the tin producing countries for the first half of 1958.

The general outlook for world tin consumption in 1958 is difficult to assess since the consumption of tin is closely related to industrial activity. It is the general belief that there may be some slight falling off in consumption in the United States and in the United Kingdom during the first part of 1958. This may be offset in the other parts of the world where the trend is still upwards.

Steel production in the United States will be down but tinplate is likely to hold its position with further expansion of production facilities because there has been no falling off in the sale of canned goods. It appears probable that 1958 tin consumption in the United States will be above 50,000 tons, and may even be higher.

## TITANIUM

**"Balanced supply and demand must come from increased military use in aircraft and missiles"**



D. W. KAUFMANN  
Manager, Titanium Sales,  
Crucible Steel Company of  
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Titanium, still only five years old as a tonnage metal, and indebted to Defense Department needs for its rapid expansion, is still suffering acute growing pains. The year 1957 illustrated this in graphic fashion.

At the end of 1956 the demand for titanium mill products exceeded capacity. The advanced supersonic fighter planes and the intercontinental bombers required tons of titanium, particularly in the compressors of the jet engines. In fact, so badly were titanium sheet and forgings needed for such applications that the missile designers were discouraged from looking to the strength-weight contribution of titanium alloys for their needs. Five thousand tons of mill product were shipped in 1956; 10,000 to 12,000 tons were foreseen as the need for 1957.

Then, even as the titanium producers expanded under forced draft, the requirements of the Defense Department changed very drastically. Military aircraft programs were phased out, extended, or abandoned. Titanium forecasts were revised frequently, always downward.

When the dust had settled, titanium was in serious oversupply. Shipments of mill products in 1957 were about half of the earlier estimates.

In view of this, what is the outlook for the titanium industry?

It appears that the demand for titanium during 1958 will be considerably below 1957. However, the long range future of the industry continues to be bright. First, while other new metals and alloys have deservedly received a great deal of attention and marked improvements made in the use of steels in aircraft construction, in the long view the ore situation is extremely favorable to titanium. In fact, in the next decade, it appears that shortages of high-grade ore will force the price of engineering metals higher and higher. Magnesium and titanium appear to be the only exceptions to this rule.

In addition to existing in ample supply—ample domestic supply—it might be added that the mining and beneficiation of titanium ore has been proven by the large titanium dioxide industry. Two principal types of deposits exist in the United

States, the solid rock type such as the McIntyre deposit in New York state and the alluvial deposits which extend south from Georgia such as the Trail Ridge deposit in Florida. Both types yield to quick and easy beneficiation.

Next, while the separation of titanium into metallic form (sponge) is admittedly not easy, substantial progress is being made. This is clearly indicated by the price trends. In December of 1956, A-1 titanium sponge was priced at \$3.00 per pound; A-2 sponge at \$2.70. In June, 1957, prices were down to \$2.25 and \$2.00. Six leading companies (Cramet, Inc.; Dow Chemical Company; E. I. duPont de Nemours & Company, Inc.; Mallory-Sharon Metals, Inc.; Titanium Metals Corporation of America; Electro Metallurgical Company, Division of Union Carbide Corporation) are currently producing titanium sponge.

In the mill product field, while the demand fell far short of anticipated requirements, there was also ground for long-range optimism. Substantial reductions have been made in the selling price of sheet, bar, and other semi-finished forms. Concurrently, 1957 marked the beginning of a healthy diversification of the use of titanium. The largest single requirement in 1957 exceeded 30,000 pounds and stemmed from the use of large-scale titanium equipment in the Freeport Sulphur Company's nickel recovery plant at Moa Bay, Cuba. Although industry figures are not available, it is estimated that shipments for commercial (non-military) uses increased by at least a factor of five over 1956.

While commercial demands are certain to increase during 1958, they cannot be expected to take up the large amount of idle melting capacity. Balanced supply and demand must come from increased military use in aircraft and missiles programs. New higher strength titanium alloys, now supplied with guaranteed heat treated properties, certainly appear to answer many important requirements of missile design.

The titanium industry appears to be in a transitional stage of temporary over supply. Long-range predictions for a healthy growth are based on a favorable domestic ore supply, on substantial technical progress in winning methods, resulting in lower prices, and on diversification of the markets of the mill product producers, particularly titanium's growth as a material of construction in the chemical process industries during the past year.

## TUNGSTEN

**"The work on developing new tungsten alloys is scheduled to continue through 1958"**



KEITH KUNZE  
General Superintendent,  
Getchell Mine, Inc., Goldenta, Nevada

The tungsten situation in 1957 is best described as "catastrophic."

High hopes were held by the domestic tungsten producers in early 1957 that the 85th Congress would appropriate sufficient funds to implement Public Law 733 for the purchase of approximately 1,000,000 units of concentrates during fiscal year 1957-1958. P. L. 733, passed by the 84th Congress, was designed to maintain a healthy domestic tungsten mining industry during the transition from a government stockpiling economy to the competitive world tungsten market. Unfortunately, a six-month fight developed in Congress over the appropriation measure, during which time the major tungsten producers continued to operate. When all efforts of the pro-

mining Congressmen were defeated by the House Appropriation sub-committee, headed by Representative Michael Kirwan of Ohio, in July, the domestic mines had accumulated stockpiles of approximately 250,000 units.

The repudiation of its 'moral obligation' under PL 733 by Congress was a devastating blow to the tungsten industry. The situation was further aggravated by the distressed position of foreign producers. The loss of United States markets, plus the termination of four major government contracts with foreign producers during 1957, had an additional depressing effect on the market. Several foreign countries, such as Bolivia, Portugal, and Republic of Korea, in critical straits for "dollar exchange," offered concentrate on a "cash at any cost" basis. The net result was that by the end of 1957 tungsten concentrates were being sold below production cost throughout the world.

Paradoxically, the consumption of tungsten was almost the same during 1957 as in 1956. This was achieved in spite of a drop in consumption during the same period of most other ferro-alloys, and is indicative of a trend on which tungsten producers pin their hopes for the future.

**Tungsten Concentrate Consumption, Production, and Imports in United States in Pounds in 1955, 1956, and 1957**

Year	Consumption	Domestic Production	Imports
1955	8,967,000	15,833,000	20,700,000
1956	9,061,000	14,761,000	20,860,000
1957*	8,600,000	7,550,000	13,400,000

\* Latest estimate.

**DPA Foreign Tungsten Purchase Program**

Company	Short Ton Units WO <sub>3</sub>	Dollars
Republic of Korea	975,000	\$ 63,375,000
Wah Chang Corp.	315,546	20,706,799
Beralt Tin & Wolfram, Ltd.	273,000	15,398,500
Minerales de Compostella	137,924	7,666,420
Compania Minera Moctezuma	128,836	6,570,636
British Italian Trading Co.	74,622	4,733,138
Korean Tungsten Mining Co.	73,424	4,554,416
Phillip Bros., Inc.	47,928	2,827,702
Derby & Co., Inc.	42,669	2,434,023
Compania Minera Celta	42,990	2,364,450
Abdon Meriadet	46,800	2,363,400
Metalurgia, Inc.	32,851	2,052,558
Metal Traders, Inc.	24,005	1,523,247
Minerales y Metales S. R. L.	20,838	1,458,660
Continental Ore Corp.	22,650	1,443,175
Total all other companies	365,066	20,070,869
Total Program	2,624,179	\$159,542,995

The high rate of tungsten consumption, coupled with an indicated expansion in the field of the jet plane, missile, gas turbine, and atomic energy programs, has been the most encouraging factor in the otherwise gloomy tungsten picture.

Unless some unexpected demand occurs, the domestic market for the next year will probably be controlled by the three or four domestic mines still operating, plus some low-cost or government-sponsored foreign production. Two factors that will have a definite effect on the tungsten market in 1958 are: (1) the scheduled expansion of the byproduct plant of Climax Molybdenum Company at Climax, Colorado from the present



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In the United States the civilian nuclear power program is directed toward developing power competitive with that produced from low-cost fossil fuels. Until that objective has been achieved and the power industry undertakes large-scale commercial programs, an estimate of the size and timing of the domestic industrial uranium requirements must be based upon the opinions of those conducting the development work. When speaking to the National Western Mining Conference a year ago, Commissioner Libby stated that "Ten to 20 years from now the United States power industry alone may require from 20,000 to 30,000 tons of U<sub>3</sub>O<sub>8</sub> per year." It has since been stated that this is still a good estimate.

In Europe the development of nuclear power facilities is expected to proceed more rapidly. There, reactors that can be built today are expected to produce power that will be approximately competitive with power produced from coal and oil. Europe is now planning large industrial atomic programs. The British are engaged in \$2,000,000,000 to \$3,000,000,000 10-year program, designed to reach a capacity of 5,000,000 to 6,000,000 kilowatts of electricity by 1965 or 1966. In a recent article by Sir Edwin Plowden, Chairman of the United Kingdom Atomic Energy Authority, this information was released on the requirements of the British program:

*"This expanding programme will require an increasing annual tonnage of uranium. Between 1,000 and 2,000 tons a year of uranium oxide will be required from the time the first stations have to be fueled, that is to say, from 1961 onwards. The demand will increase steadily until well into the 1970's, when it will probably lie between 5,000 and 10,000 tons a year. It is difficult to estimate later requirements accurately, as they will depend on the rate of increase in the demand for electricity, and on the types of*

**DPA Domestic Purchase Program for Tungsten**

Company	Short Ton Units WO <sub>3</sub>	Dollars
Union Carbide Corp.*	693,132	\$ 43,667,321
Wah Chang Corp.	523,459	32,886,392
Tungsten Mining Corp.	437,027	27,531,826
Getchell Mines, Inc.*	238,400	16,133,866
Nevada-Massachusetts Co.	192,781	12,143,018
Mineral Engineering Co.*	184,666	11,457,919
Nevada Schelite Corp.	150,466	9,932,007
Bradley Mining Co.	84,379	5,313,838
Surence Mining Co.	31,694	1,991,895
Climax Molybdenum Co.	6,951	437,927
Total, all other companies	405,569	25,062,223
Total Program	2,968,724	\$186,075,032

\* Sales of Companies marked with (\*) include concentrates from Custom Ore purchases. Sales under P.L. 733 for a total of 282,674 units are not included in above breakdown.

20,000 tons per day to 34,000, and (2) the chemical refinery scheduled for completion in June, 1958 by the Korean Tungsten Mining Company, for treatment of its low-grade concentrate from the Sang Dong mine.

A report on the tungsten supply situation was issued by the Attorney General's office on November 8th, 1957. This included a comprehensive review of the various stockpiling programs that have been the dominant factor in tungsten mining since the Korean War emergency. The critical shortage of tungsten in 1951 created by the Korea war gave rise to three different government stockpile programs:

Program	Authority	Short Ton Units Purchased	Cost
Domestic Tungsten Program	DPA GSA 113 PL 733	2,968,724 282,674	\$186,075,032 15,546,000
Foreign purchase program	DPA	2,624,179	159,542,993
National Stockpile <sup>1</sup>	Strategic & Critical Materials Stockpile Act	Amounts classified <sup>2</sup>	

1. Four contracts under this program will terminate in 1958 and one contract on December 4th, 1959. 2. Although actual amounts purchased are classified, testimony given in Congress indicated that an excess of \$250,000,000 will be spent on this program.

## URANIUM

### "AEC purchases will require an ore delivery rate of 5,500,000 tons in 1958; 7,200,000 in 1959"

*reactor built to satisfy this; but by the mid-seventies uranium will be needed not only for the large initial charges for new reactors but also for the smaller replacement charges for those reactors already working."*

The Euratom countries are considering a \$6,000,000,000 10-year program to provide 15,000,000 kilowatts of electrical capacity by 1967. It has been stated that estimates for such a program might require 35,000 to 70,000 tons of U<sub>3</sub>O<sub>8</sub> or 5,000 to 10,000 tons a year if delivered in a seven-year period. Also, that if the requirements during the succeeding 10 years follow the British pattern as indicated by Sir Edwin Plowden, annual requirements of the Euratom countries might reach 30,000 tons a year or more.

Jesse C. Johnson of the AEC announced in New York, New York in October 1957, that uranium deliveries under the Commission's present domestic and foreign procurement commitments appeared adequate for military and power requirements as projected for the next few years. Also, that under these circumstances the Commission, at that time, was faced with limiting commitments for additional domestic uranium.

However, the increasing United States government market for domestic uranium was indicated in a recent announcement made by Mr. Johnson. Domestic uranium concentrate purchases by the AEC were approximately \$134,000,000 in 1956 and \$171,000,000 in 1957. Purchases for 1958 were estimated at \$247,000,000 and for 1959, at \$322,000,000 or almost double that of 1957. These purchases, stated in terms of ore production, will require a mine ore delivery rate of 5,500,000 tons in 1958 and about 7,200,000 tons in 1959 as compared to the United States production in 1957 of 3,676,000 tons.

The year 1957 marked the continued major increase in uranium production throughout the Free World and especially in Canada and the United States. Total Free World production in 1957 amounted to about 21,000 tons of U<sub>3</sub>O<sub>8</sub>, and the estimate for 1959 is in excess of 40,000 tons, with more than 30,000 tons coming from the United States and Canada. Major increases in uranium production will occur in the next 12 to 14 months with the completion and operation of a number of large Canadian and American uranium mining and milling projects.

Uranium concentrates produced in the United States in 1957 totaled 8,640 tons of  $U_3O_8$ . Canada about 4,000 tons, and South Africa about 6,000 tons, with the balance being principally produced by the Belgian Congo, France, Australia, and Portugal.

#### United States Developments:

##### Uranium Production

	1957	1956	1955*
Concentrates (tons $U_3O_8$ )	8,640	6,000	1,600
Tons of ore	3,676,000	3,000,000	840,000
December milling rate, operating mills (tons per day)	11,085	8,960	4,500
Capacity, plants under construction (tons per day)	9,935	4,575	2,450
* 6 months, July-December 1955			

In December 1957, United States mills were producing concentrates at a rate of about 800 tons of  $U_3O_8$  per month and treating an average of about 10,150 tons of ore per day having an average grade of 0.27 percent  $U_3O_8$ . Four new mills commenced operations during the year and nine mills under construction at year's end will commence operations in 1958 or early 1959. Two of the older mills operating in December 1957 are scheduled to close down early in 1958, one being replaced by a new and larger plant and the other operation being consolidated with an existing plant.

Domestic ore reserves (measured, indicated and inferred ore) are now estimated at 78,000,000 tons or an increase during the year of some 18,000,000 tons. The major part of the increase resulted from extensive exploration in two districts, one in New Mexico and the other in Wyoming. The distribution by states in the United States is as follows:

Area	December 31, 1957		November 1, 1956	
	Tons	Per cent $U_3O_8$	Tons	Per cent $U_3O_8$
New Mexico	53,300,000	0.26	41,000,000	0.24
Wyoming	9,200,000	0.26	2,300,000	0.22
Utah	5,700,000	0.37	7,500,000	0.34
Colorado	4,100,000	0.29	4,100,000	0.33
Arizona	1,400,000	0.32	2,600,000	0.30
Washington, Oregon, & Nevada	1,900,000	0.23	—	—
North and South Dakota	600,000	0.25	2,500,000	0.20
Others (Texas, California, Montana, Idaho, & Alaska)	1,800,000	0.23	—	—
Totals	78,000,000	0.27	60,000,000	0.25

**Markets:** The principal market for Free World production of uranium has been purchases made by the United States government through contracts with domestic producers and foreign governments. In November 1957, the AEC Commission released an unclassified financial report for the fiscal year 1957 (July 1, 1956 thru June 30, 1957), which contained heretofore unpublished information on uranium concentrate procurement. In fiscal year 1957, a total of 32,355,000 pounds of uranium were purchased, of which 15,204,000 pounds came from the United States, and 17,151,000 pounds from foreign countries. Total expenditures for this material were \$355,865,000, of which \$164,182,000 was for the domestic product, and \$191,683,000 was for material from other countries. The average cost per pound of uranium concentrate from domestic sources in fiscal year 1957 was \$10.80 per pound of  $U_3O_8$ , which was 10 percent lower than in fiscal year 1956. The average from other countries was \$11.18 per pound of  $U_3O_8$ , and the average from all sources was \$11.00 per pound of  $U_3O_8$ . These figures include certain costs in addition to the price paid producers.

The trend in average prices paid for uranium concentrates is shown by a recent announcement made by Jesse C. Johnson on prices paid under existing contracts with the AEC which includes all United States purchases of raw materials. The average price paid for domestic concentrate in fiscal year 1958 was \$11.60 per pound of  $U_3O_8$  and in 1957, \$10.50. The estimate for fiscal year 1958 is \$9.60 and for 1959, \$9.30. These prices include a factor for amortization on a five-year basis and are based upon an estimated normal grade of mill feed. Domestic production prices vary and may be somewhat higher or lower, depending on variances in mill feed grade. The average price paid in United States dollars for foreign concentrate was \$10.90 per pound of  $U_3O_8$  in fiscal year 1956 and \$11.15 in 1957. The estimate for 1958 is \$11.15 and for 1959, \$10.70. All contract prices, domestic and foreign, have been negotiated on the estimated costs of production or are related to audited costs of production.

These price differences do not indicate the wide differences in the uranium content of the material processed. Recovery from South African gold tailings averages about one-half a pound of  $U_3O_8$  per ton. In Blind River, Canada's major uranium field, recovery will be about two pounds per ton of ore. In the United States, it is about five pounds.

## VANADIUM

### "A problem of cost survival in older Plateau vanadium producing areas is developing"



BLAIR BURWELL  
President, Minerals Engineering Company, Grand Junction, Colorado

Vanadium production in the United States is estimated to be 12,540,000 pounds of  $V_2O_5$  in fused oxide for 1957 compared with 14,060,000 pounds in 1956. American consumption is estimated at 3,590,000 pounds of vanadium or 7,180,000 pounds of oxide equivalent compared with 3,976,000 pounds of vanadium in 1956. Exports were approximately 2,660,000 pounds of fused oxide or alloy equivalent. With industry stocks about the same in the year ending of 1957 as in 1956, a discrepancy of 3,000,000 pounds of  $V_2O_5$  in fused oxide is to be noted in government figures. This is partially represented by stocks in the hands of mills with Atomic Energy Commission contracts who withheld delivery by government request, and part by consumption for uses not reported by industry.

Seventy-five per cent visible consumption of vanadium continues in ferrous uses, such as engineering steel, cast iron, tool steel, and high speed steel, and in these uses, most of the reduction of consumption occurred in 1957. Increased interest and consumption of the metal in aluminum-vanadium alloy for high-strength titanium and as pure ductile metal was noted in 1957. Ductile vanadium for cladding in atomic energy power stations has generated interest here and in Europe. Research on uses, as a catalyst in automobile engine exhausts for reducing smog and carbon monoxide, has generated interest.

Interest in production of pure vanadium oxide low in soda adapted to direct steel additions developed in 1957. Conven-

tionally, vanadium is used as ferrovanadium which is usually made by aluminum reduction of high soda oxide which adds to the cost of vanadium in steel. One large producer initiated the sale of self-reducing mixtures containing fused oxide and ferrosilicon in 1957 which could be substituted for ferrovanadium in certain uses. The low soda avoids former difficulty with furnace linings. The trend may increase in 1958 as it decreases final user costs and holds prices of fused oxide at the expense of the intermediate ferro alloy industry.

The United States continued to be the largest producer in the world, exporting a substantial portion of its output. Outside of the United States the production of vanadium from iron ores increased in northern Europe and is reported to have occurred in Russia. An initial output of fused oxide from iron ores of the Transvaal, Union of South Africa, occurred at the year end. Lead vanadate mines in South West Africa further curtailed in 1957 and suspended production at the year end.

The outlook for vanadium markets and consumption for the future looks attractive because of new uses and applications indicated by research which have been stimulated to a certain extent by the assurance of abundant supply from uranium-vanadium ores of the Colorado Plateau. However, it must be noted that new and extensive discoveries of Colorado Plateau ore in 1957 were of the type low in vanadium and new mills and mines do not contemplate vanadium recovery due to low content. The original uranium-vanadium recovery plants of the higher vanadium ores are relatively high cost due to duplex processing and old mills, and are dependent on depleted ore reserves of deeper burial and high mining cost. As older high-priced uranium contracts expire on original mills and are replaced by lower competitive prices by the AEC, a problem of cost survival in older Plateau vanadium producing areas is developing and probably will reduce output substantially in 1958.

# A LOOK AT U. S. Mining in 1957

## Alaska

### ● Exploration for Iron and Copper Is at High Level; Hg Output Is Still Growing

Alaska's mineral production for 1957 is estimated at nearly \$26,000,000, an increase of 11 percent over that of 1956. Gold, coal, and sand and gravel are the three commodities at the top of the list in value. Gold apparently leads coal by a very slight margin, but might be surpassed when the final returns are in. Mercury is in apparent fourth place, but platinum and uranium were in large-scale production and may have been as high in value. The production figures for these last two commodities cannot be revealed.

Lode gold mining is practically nonexistent in Alaska, and placer operators continue to be forced out of operation by increasing costs. The major portion of the gold production was by United States Smelting, Refining and Mining Company from its Fairbanks and Nome dredging operations. Goodnews Bay Mining Company operated as usual in the Bristol Bay area and continues to be the major United States platinum producer. DeCoursey Mountain Mining Company surpassed their last year's record for mercury production. Kenai Chrome Company continued to mine chromite but was closed down earlier than usual by weather conditions. The most important development of the year was the first uranium mine in Alaska operated by a subsidiary of Climax Molybdenum Company.

SOUTHEASTERN—Climax Molybdenum Company started an open pit uranium mine on Prince of Wales Island, shipping by barge and rail to Dawn Mining Company's mill near Spokane, Washington. Columbia Iron Mining Company (United States Steel subsidiary) continued investigations and drilling of iron possibilities throughout Southeastern Alaska, and concentrated another large quantity of material at the Klukwan deposit for testing. Utah Company of the Americas of Vancouver is

### Please Turn To

Page 224 for charts showing U. S. mine production of key metals from 1900 to 1958.

Page 221 to check Minnesota, Michigan, and Wisconsin mine shipments of iron ore.

Page 222 for listing of tonnages mined at important U. S. open pit mines.

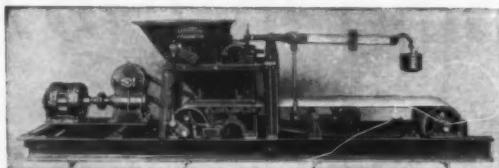
Page 223 to see the rank of the major underground U. S. mines.



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Dolomite	Lime Pebble	Seashells
Feldspar	Lime Hydrated	Stone
Ferric Sulphate	Lime Granular	Sulphur
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		Light Duty	Heavy Duty		
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10"	2' 6"	5 Tons		Finely ground	No
14"	4' 6" & 6' 0"			Finely ground	No
14"	2' 6"	8 Tons		1/2" Cubes	No
20"	4' 6" & 6' 0"	10 Tons		1/2" Cubes	No
20"	2' 6"	20 Tons		1 1/2" Cubes	No
20"	4' 6" & 6' 0"	15 Tons		1 1/2" Cubes	Yes
30"	4' 6" & 6' 0"	45 Tons		3" Cubes	Yes
36"	4' 6" & 6' 0"	125 Tons		4" Cubes	Yes
48"	4' 6" & 6' 0"	160 Tons		4 1/2" Cubes	Yes
48"	2' 6"	250 Tons			

\* Figured on material weighing 100 lbs. per cubic foot. Amount shown is capacity per hour.

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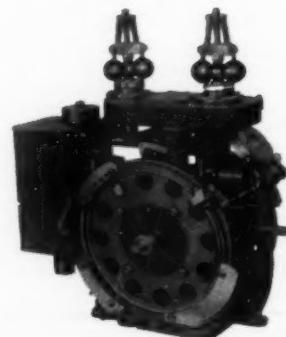
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### Mineral Production of Alaska from 1955 through 1957

Mineral	1955		1956		1957 <sup>1</sup>	
	Quantity	Value	Quantity	Value	Quantity	Value
Chromite <sup>1</sup>	7,082	\$ 625,340	7,193	\$ 711,481	4,200	\$ 427,000
Coal, bituminous <sup>1</sup>	639,696	5,759,000	726,801	6,373,976	825,000	7,425,000
Gold <sup>2</sup>	249,294	8,725,000	209,296	7,325,360	215,000	7,525,000
Lead <sup>1</sup>	—	—	1	314	1	268
Mercury <sup>3</sup>	(5)	(5)	3,280	852,539	5,300	1,309,100
Sand and gravel <sup>1</sup>	9,793,214	8,242,344	5,955,105	5,879,799	5,800,000	5,900,000
Silver <sup>4</sup>	33,693	30,394	28,360	25,667	26,000	23,500
Stone <sup>1</sup>	265,740	289,589	194,864	394,894	120,000	370,000
Tin <sup>1</sup>	86	182,484	—	—	—	—
Undistributed <sup>6</sup>	—	1,557,307	—	1,643,937	—	3,010,250
TOTAL		\$25,412,000		\$23,408,000		\$25,996,000

\* Estimated. 1. Short tons. 2. Fine ounces. 3. Flasks. 4. Long tons. 5. Value included with undistributed mineral stones and other minerals whose value must be concealed to avoid disclosing company incomes. 6. Includes platinum.

drilling two iron deposits on Prince of Wales Island. Admiralty Alaska Gold Mining Company is continuing its exploration program on its nickel lode at Funter Bay. A uranium prospect near William Henry Bay was drilled.

SOUTH CENTRAL—Kenai Chrome Company continued mining and shipping metallurgical grade chromite from the Star 4 property on Red Mountain, and also stockpiled lower grade ore for treatment at its new mill during the winter. Investigation of the Red Top mercury deposit near Dillingham was continued. Northern Pyrites continued drilling a pyrite deposit on Latouche Island for the third consecutive season.

YUKON BASIN—Earle Pilgrim made a shipment of highgrade antimony ore from the Stampede Mine in the Kantishna. DeCoursey Mountain Mining Company increased mercury production to a new high and is on a year-around basis. Other mercury deposits in the region are being investigated. United States Smelting, Refining and Mining Company put in a full season of dredging in the Hogatza River area. Other large dredging concerns operated about as usual.

NORTHWESTERN—Rhinehart Berg's Ruby Creek copper prospect near Shungnak was under option and being drilled by Bear Creek Mining Company.

## Arizona

### ● Metal Output Is Up But Value Goes Down; Ray Mines and Duvall Projects Progress

The total value of Arizona's mineral production in 1957 (exclusive of uranium) is estimated at \$360,626,000 compared to \$479,551,000 in 1956. The decline resulted from the lower value of the state's copper output as the average price per pound declined from 42.5 cents in 1956 to 30 cents in 1957.

Arizona's 1957 copper output totaled 512,600 tons valued at \$307,560,000, compared to 505,908 tons valued at \$430,021,800 in 1956. While the actual tonnage produced in 1957 was greater than in 1956, the lower price received meant a drop of \$122,461,800 in value.

San Manuel Copper Corporation reached its scheduled rate of production in June, and became the state's fourth-ranking producer, replacing Kennecott Copper Corporation's Ray Division which now holds fifth place. The three largest producers again were the Morenci, Copper Queen and New Cornelia operations of Phelps Dodge Corporation.

Pima Mining Company became Arizona's newest open-pit copper mine in January 1957 when the 3,300-ton-per-day flotation plant was placed in operation.

American Smelting and Refining Company announced a major copper discovery in the East Pima District. Indicated reserves were said to be about twice the size of the company's Silver Bell copper mine in Arizona. The East Pima area is adjacent to the 15,000 acres of Papago Indian Reservation land for which Asarco in May bid \$1,066,007 for the exploration rights.

A second development is the preparation of the Esperanza mine for production by Duval Sulphur and Potash Company. Some 5,000,000 tons of overburden are being stripped from a low-grade copper deposit with important molybdenum content. A 10,000-ton-per-day flotation plant is being erected and the target date for production is set for early 1959.

Inspiration Consolidated Copper Company made history with the conversion of copper recovery facilities to the Dual-Process. The ore is acid-leached to recover the copper oxide, and the residue goes to Inspiration's rebuilt, 15,000-ton flotation mill for recovery of the copper sulphide fraction. The concentrator was started in January 1957. Progress was made by Ray Mines Division of Kennecott Copper Corporation on a \$40,000,000 program of mine and mill expansion and smelter construction. The L.P.F. plant at Ray Mines moved to completion during the year.

Copper concerns embarked on curtailment and cost-reduction programs. With a few exceptions, the work-week for hourly employees of the major producers was reduced from 48 hours to 40 hours to cut the number of hours at premium pay. In addition, the following production cuts had been announced before the year's end: Phelps Dodge, 22 percent; Miami, 23 percent; Inspiration, 17 percent; Kennecott's Ray Mines, 15 percent; and Banner, 65 percent.

The Iron King mine, operated by Shattuck-Denn Mining Corporation and the state's leading lead-zinc producer was active throughout the year.

Several other lead-zinc producers were forced to close near mid-year.

### Arizona Production of Molybdenum, Gold, Silver, Copper, Lead, and Zinc. Dollar Value of Base Metals From 1941 through 1957

Year	Molybdenum Pounds	Gold Ounces	Silver Ounces	Copper Tons	Lead Tons	Zinc Tons	Dollar Value
1941	NA	315,392	7,498,260	326,317	15,638	16,493	\$ 97,638,310
1942	255,651	7,064,467	393,387	14,772	18,522	114,525,600	
1943	"	171,810	5,713,889	403,181	13,727	19,677	121,212,902
1944	"	112,162	4,394,039	358,303	16,707	29,077	113,094,806
1945	"	77,223	3,558,216	287,203	22,867	40,226	95,963,006
1946	"	70,224	3,068,765	320,213	23,320	43,745	114,986,254
1947	"	95,800	4,500,444	366,218	28,566	54,644	182,747,537
1948	"	109,487	4,837,740	375,121	29,899	54,478	190,207,948
1949	"	108,993	4,970,736	359,021	33,568	70,658	177,894,134
1950	"	118,313	5,255,441	403,301	26,383	60,480	201,033,694
1951	1,172,740	116,093	5,120,985	415,870	17,394	52,999	235,289,045
1952	2,022,832	112,355	4,701,330	395,719	16,520	47,143	220,686,278
1953	1,446,557	112,824	4,351,429	393,525	7,092	19,613	242,572,489
1954	1,538,088	114,809	4,298,811	377,927	8,385	21,461	237,818,952
1955	1,497,000	127,616	4,634,179	454,105	9,817	22,684	232,928,786
1956	2,392,000	146,110	5,179,185	505,908	11,999	25,580	453,270,137
1957 <sup>1</sup>	2,370,000	157,300	5,336,000	512,600	12,500	33,300	331,882,350

1. Estimated by U. S. Bureau of Mines. NA—Not available.

These included McFarland and Hullinger at the San Xavier mine; the Coronado Copper & Zinc Company, Johnson Camp, copper-zinc operation; and Asarcos Trench unit.

Uranium activities in the Globe area received a near-fatal blow when the AEC closed its buying station at Cutter on June 30 because of limited ore receipts and difficult metallurgy. However, production from the Four Corners area continued, and the 250-ton uranium processing mill at Tuba City was operated throughout the year by Rare Metals Corporation of America. In 1957, negotiations were started for authorization to increase the plant's capacity to 400 tons daily.

## California

### ● New Borax Facilities Are Completed; Iron Ore Output Holds Steady at 1956 Pace

Mining output was down in California during 1957. The value of metal recovered from ore declined 23 percent under 1956 figures. Income from non-metallic minerals during 1957 was somewhat lower than in 1956.

Iron ore production at Kaiser Stell Corporation's Eagle Mountain mine was a bit higher in 1957. Kaiser carried on a \$194,000,000 expansion program which was expected to nearly double the capacity of the Fontana steel mill. A second ore beneficiation plant was completed and placed in operation at Eagle Mountain mine. Several mines in San Bernardino County shipped modest tonnages of iron ore.

In mid-1957 a milestone was reached when United States Borax & Chemical Corporation started mining borax ore from a newly developed open pit. The open pit was part of a \$20,000,000 project to centralize mining and treatment facilities at Boron, California. The project included a 10,000,000 ton stripping program and construction of a new \$18,000,000 refinery.

Pyrite production was higher in 1957 due largely to steady production from a new open pit at the Iron Mountain property of Mountain Copper Company. The open pit was brought into full production in the latter part of 1956 and replaced underground induced caving methods of ore extraction.

Gold output dropped to a 12 year low due to cessation of underground lode mining activities in Nevada County. High grade lode gold mines in El Dorado, Sierra and Siskiyou Counties continued to operate. More than 70 percent

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**California Production of Metals and Minerals. Dollar Value is Given For Base and Precious Metal Output From 1941 Through 1957**

Year	Iron Ore Long Tons	Chromite Tons	Mercury Flasks	Tungsten Tons (60% WO <sub>3</sub> )	Boron Minerals Tons	Gold Ounces	Silver Ounces	Copper Tons	Lead Tons	Zinc Tons	Dollar Value
1941	60,293	13,419	25,714	2,603	301,282	1,408,793	2,154,188	3,943	3,464	440	\$52,231,066
1942	95,107	44,873	29,906	3,483	226,723	84,328	1,450,440	1,058	5,151	613	31,771,607
1943	794,440	62,795	33,812	3,871	236,633	148,328	609,075	8,762	5,820	1,856	9,176,616
1944	845,260	31,715	28,632	3,027	277,586	117,373	778,936	12,721	5,682	8,455	10,933,495
1945	280,570	9,607	21,199	1,023	325,935	147,938	986,798	6,473	7,224	9,923	11,152,081
1946	340,491	4,107 <sup>2</sup>	17,782	1,662	400,059	156,824	1,342,651	4,240	9,923	6,877	18,788,664
1947	530,434	948	11,165	394	501,935	431,415	1,597,442	2,407	10,080	5,415	21,769,620
1948	153,684	274	11,188	1,767	450,932	421,473	724,771	481	9,110	5,325	20,294,093
1949	536,525	433	4,493	952	467,592	417,231	783,880	649	10,318	7,209	20,616,562
1950	831,445	404	3,850	2,025	647,735	412,118	1,071,917	696	15,831	7,551	22,081,859
1951	1,198,847	6,302	4,282	3,007	862,797	339,732	1,145,219	921	13,967	9,602	21,700,575
1952	1,516,373	14,713	7,241	2,980	583,828	258,176	1,099,658	800	11,199	9,419	17,151,792
1953	1,697,652	26,512	9,290	2,130	715,228	234,591	1,036,072	382	8,664	5,358	12,870,230
1954	1,270,292	30,661	11,262	3,089	790,449	237,886	309,575	362	2,671	1,415	9,857,265
1955	1,776,536	22,105	9,875	4,383	924,496	251,737	954,181	613	8,265	6,836	14,276,301
1956	2,414,277	27,082	9,017	3,719	315,047*	193,816	938,139	859	9,296	8,049	13,487,143
1957 <sup>1</sup>	2,470,000	32,000	14,250	2,700	308,000*	166,700	515,000	830	3,640	2,980	8,532,300

1. Estimated by U. S. Bureau of Mines; \* Reported as B<sub>2</sub>O<sub>3</sub> content of ore.

of California gold was recovered from placer operations.

Mercury registered a substantial gain in 1957 due partly to a plant clean-up by New Idria Mining & Chemical Company. New Idria has discovered additional ore along the west side of a thrust fault zone, an area previously considered barren, and nearly all recent production has been mined in this area. Other producers contributing to the increase were California Quicksilver Mines, Inc. and Palo Alto Mining Company. In a major transaction, the Altoona Quicksilver lease in Trinity County was sold to Rare Metals Corporation of America.

Little copper production was recorded other than by-product copper recovered from processing of lead, zinc or tungsten. Exploration activity was high, however, in the Shasta District northwest of Redding. Both Phelps Dodge Corporation and Miami Copper Company were reported to be carrying on search programs.

In Madison County the Mine La Motte Corporation and the National Lead Company each operated a mine group and mill. Mine La Motte, jointly owned by St. Joseph Lead Company and National Lead, engaged in shaft sinking to open up a lead ore body on a property located 30 miles south of the Lead Belt. This district is said to offer good potential and as many as four shafts may be required for mining.

Commercial quantities of copper, cobalt and nickel are recovered from the ore mined by National Lead. The company's cobalt refinery at Fredricktown reportedly operated at greater capacity in 1957.

Ozark Ore Company closed down its underground mining operations at Iron Mountain, Missouri, for a short period while five conveyor belts and the primary crusher were moved to a lower level.

In the northern Illinois-Wisconsin lead-zinc region, lead output declined 11 percent. Tri-State Zinc, Inc., one of the three leading producers in the district, maintained production rates at a fairly high level. Output from properties of American Zinc Lead & Smelting Company and Eagle Picher Company was greatly curtailed.

Zinc recovered in Illinois was down 8 percent in 1957. The decrease resulted largely from curtailment of output from the fluor spar-lead-zinc mines in southern Illinois. Zinc production in northern Illinois-Wisconsin district was slightly greater in 1957.

The Illinois-Kentucky area contributed nearly 200,000 tons or 65 percent of the estimated total domestic output of fluor spar in 1957. Illinois' share of production amounted to about 180,000 tons. An independent producer, H. Evans Roberts, acquired the Humm Mackey-Hicks Creek properties. Major fluor spar opera-

tors and consumers were actively running surveys and geologic investigations in the area during 1957.

Missouri's Howell County iron ore industry went far ahead of the \$1,000,000 mark last year according to reports. Some 60 mine operators were active and approximately 2,805 carloads of ore was shipped in 1957 from the West Plains and Brunderville area.

## Colorado

### ● Large Mines Produce More Metal as Mo, Cu, Pb, Zn Output Higher Than 1956

With Colorado's large mines operating at record and near record capacity during 1957 production of molybdenum, copper, lead, zinc, pyrite, and acid grade fluor spar increased over 1956. However, the number of producing units dropped radically because of the price drops in copper, lead, and zinc.

The Climax Molybdenum Company Division of American Metal Climax, Inc. set an all-time yearly high of about 10,800,000 tons of ore mined and milled. First six months production was 5,327,000 tons assaying 0.352 percent MoS<sub>2</sub>. This is also the greatest tonnage ever mined from one underground mine in the United States in a single year. Molybdenum output was increased to about 43,000,000 pounds from 37,489,000 in 1956. Climax was also the state's largest tungsten and tin (byproduct) producer but no concentrates of these two metals were sold during the year. Byproduct pyrite

### Colorado Production of Molybdenum, Tungsten, Gold, Silver, Copper, Lead, and Zinc. Dollar Value of Base Metals From 1941 Through 1957

Year	Molybde- num Pounds	Tungsten 60% WO <sub>3</sub> Tons	Gold Ounces	Silver Ounces	Copper Tons	Lead Tons	Zinc Tons	Dollar Value
1941	27,751,273	646	380,029	7,301,697	6,748	12,574	15,722	\$23,877,597
1942	41,852,136	380	268,627	3,096,211	1,102	15,181	32,215	19,896,623
1943	46,133,715	378	137,558	2,664,142	1,028	18,032	44,094	19,205,415
1944	23,608,421	296	110,515	2,48,830	1,048	17,698	39,995	17,724,473
1945	18,525,041	234	100,935	2,26,780	1,485	17,044	35,773	16,676,521
1946	10,816,426	213	142,613	2,40,151	1,754	17,036	36,147	19,903,509
1947	11,512,719	68	168,279	2,557,653	2,150	18,696	38,745	23,868,179
1948	13,172,094	208	154,802	3,011,011	2,298	25,143	45,164	30,155,337
1949	10,752,817	222	102,618	2,894,886	2,403	26,853	47,703	27,474,322
1950	11,903,043	196	130,390	3,492,278	3,141	27,007	45,776	29,323,268
1951	22,538,739	336	116,503	2,787,882	3,212	30,336	55,714	38,931,539
1952	23,874,408	625	124,594	2,813,643	3,606	30,066	53,203	35,997,231
1953	37,306,341	864	119,218	2,200,000	2,941	21,754	37,809	22,247,780
1954	42,544,795	927	96,146	3,417,072	4,523	17,823	35,150	21,602,205
1955	43,043,000	1,152	85,577	2,772,073	4,323	15,805	35,350	22,240,009
1956	37,489,000	873	97,668	2,284,701	4,228	19,858	40,246	26,342,138
1957 <sup>1</sup>	43,000,000	13	88,200	2,834,000	5,200	21,000	46,200	25,445,900
	Vanadium	5	582,484	pounds				
	Vanadium	5	254,500	Uranium oxide	3,386,773	Pounds		

### Kansas Production of Lead, and Zinc from 1941 Through 1957

Year	Lead Tons	Zinc Tons
1941	14,538	51,403
1942	9,419	55,874
1943	9,213	56,944
1944	9,394	63,703
1945	7,370	48,394
1946	6,445	47,703
1947	7,285	41,497
1948	8,386	35,577
1949	9,772	29,433
1950	9,487	27,176
1951	8,947	28,004
1952	5,916	25,482
1953	3,347	15,515
1954	4,033	19,110
1955	5,498	27,611
1956	7,635	28,665
1957 <sup>1</sup>	4,300	15,800

1. Estimated by U. S. Bureau of Mines.

1. Preliminary, U. S. Bureau Mines.



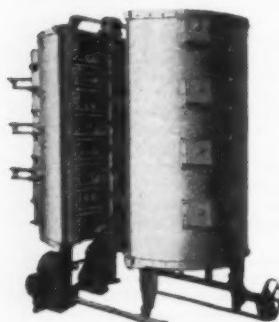
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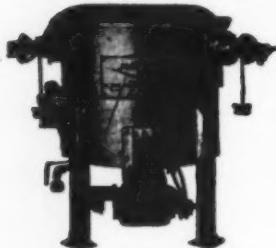
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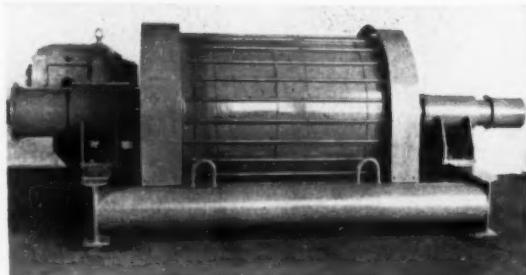
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was also produced and sold to a sulphuric acid plant. Byproduct production from Climax will increase in 1958 as the new plant under construction during 1957 will be on stream early in 1958 to treat the 34,000 daily tons of molybdenum tailing; the old plant's capacity being only 20,000 daily tons. Climax celebrated the mining of the first 100,000,000 tons of ore on February 4. Work started late in the year to sink an 18-foot diameter circular shaft to the 1,000 foot level for deep exploration and development.

Expanded output of base metals was largely the result of higher tonnage mined at the remodeled 1,400 ton per day Telluride mill of Idarado Mining Company, and the regular operations of the Empire Zinc Division, New Jersey Zinc Company at Gilman. Idarado mined and milled 455,000 tons of gold-silver-lead-zinc-copper ore from the Black Bear and Argentine vein systems, increased development footage, and initiated a large diamond drill program. Empire Zinc continued deep development and stope preparation, made a series of underground geophysical surveys, and continued regular production of 4,400 tons of zinc concentrate, 700 tons of lead concentrate and 1,800 tons of copper-silver ore per month.

Five uranium mills produced 18 percent of United States uranium concentrate. Mills operated were: Climax Uranium Company; Naturita and Durango mills of Vanadium Corporation of America; and Uravan and Rifle mills of Union Carbide Nuclear Corporation. At year's end Carbide Nuclear had virtually finished its new Trace Elements mill at Maybell, its uranium upgrader at Slick Rock, and a new mill at Rifle. Gunnison Mining Company's new mill construction at Gunnison was about finished during the year.

Colorado continued to be an important fluorspar producer with Ozark-Mahoning Company operating its 120 ton per day acid grade flotation mill at Northgate, and open pit and underground mines throughout the year. General Chemical Company also produced concentrate from its Boulder County operations.

## Eastern

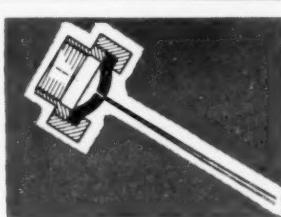
### ● Kennecott To Build New Copper Refinery; New York Is Number One Zinc Producer

New York was again the largest zinc-producing state in the nation in 1957. A 10 percent increase in zinc output from St. Joseph Lead Company's Balmat and

### Production of Metals and Minerals in New Jersey, New York, Pennsylvania,\* and Virginia in 1956 and 1957

	1956	1957 <sup>1</sup>
New Jersey		
Zinc <sup>2</sup>	4,667	12,400
Iron <sup>3</sup>	911,535	919,000
New York		
Silver <sup>4</sup>	84,158	83,800
Lead <sup>4</sup>	1,608	1,200
Zinc <sup>4</sup>	59,111	64,900
Pennsylvania		
Cobalt <sup>5</sup>	533,329	622,000
Virginia		
Manganese <sup>2</sup>	20,231	15,500
Zinc <sup>2</sup>	19,196	18,900
Lead <sup>2</sup>	3,035	3,250

1. Estimated by U.S. Bureau of Mines. 2. Short tons. 3. Long Tons. 4. Fine Ounces. 5. Pounds.  
\* Copper and iron tonnages not reported by U.S. Bureau of Mines.



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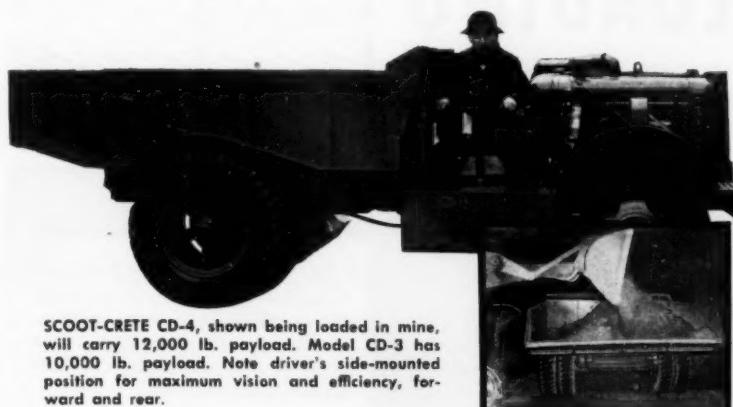
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Percent Solids	Sp. Gr. Pump	TONS SOLIDS PER 24 HOURS				
		GALLONS PER MINUTE				
		20	30	40	50	60
10	1.07	13	19	26	32	48
20	1.14	27	41	55	68	82
30	1.23	44	67	89	111	133
40	1.34	64	97	120	161	193
50	1.46	87	130	174	217	261

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Edwards mines in St. Lawrence County raised the state's estimated 1957 total to 64,900 tons. The Balmat continued to be the largest zinc mine in the United States. In New Jersey, zinc production showed a marked increase. New Jersey Zinc Company operated the Sterling mine from January to mid-August, then shut-down pending market improvement. Even so, zinc output was higher in 1957 because the Sterling mine was closed the first 8 months of 1956 by a strike.

Recovery of zinc from Virginia ores in 1957 was just slightly less than in 1956. New Jersey Zinc Company operated the Austinville mine continuously except for a 3-week shutdown due to a strike. The 13,000-foot tunnel between the Austinville and Ivanhoe mines was completed during the year. The tunnel provides a haulageway and a means for quick transportation of supplies between the two mines. At Timberville, Virginia the newly developed zinc mine and 700-ton mill of Tri-State Zinc, Inc., reached the productive stage in the summer of 1957. St. Joseph Lead Company closed its plant at Moundsville, West Virginia which recovers zinc from residues. The prevailing low price of zinc was the reason cited for suspension of activities.

In Pennsylvania, Bethlehem Cornwall Corporation continued an extensive development program at the Grace mine. Full-scale operation of the Grace mine is slated this year. Important quantities of by-product cobalt concentrate is produced from ore mined by Bethlehem Cornwall. Cobalt output increased 17 percent during 1957. Iron ore output was slightly higher in 1957.

Interest in ilmenite exploration ran high in New Jersey during 1957, following a late 1956 announcement by state geologists of the occurrence of commercial quantities and grades of this mineral. American Smelting & Refining Company was among those actively investigating titanium-bearing sand deposits. Asarco leased thousands of acres of land in an area located between Lakehurst, New Jersey and the Atlantic Ocean.

Metal & Thermit Company started production of rutile and ilmenite from a plant at Beaver Dam, Virginia. The ore containing about 2.5 percent heavy minerals, split about 50-50 rutile and ilmenite, is strip mined with tractor-drawn scrapers. It is concentrated by spirals, tables, magnetic separators and high tension separators.

The Tahawus, New York, ore mined by National Lead Company contains approximately 18 percent titanium dioxide and 34 percent iron according to a U. S. Bureau of Mines survey. The survey set National Lead's Essex County reserves of titanium-bearing ore at about 121,500,000 tons.

## Idaho

### ● Lead and Zinc Output Show Substantial Gain; Open Pit Developed at Cobalt Mine

Production gains were scored by all of Idaho's principal minerals in 1957 with the exception of phosphate rock, tungsten, mercury and titanium. Value of the output, however, fell off 2 percent from 1956, principally because of lower prices for zinc, lead and copper.

Lead again was the state's leading metal in point of value of production. Output was up 9 percent to 70,225 tons

—highest since 1953—for a valuation of more than \$20,200,000. Largest production increases were made by two Shoshone County firms—the Bunker Hill Company and American Smelting and Refining Company.

Zinc output increased 18 percent to 58,600 tons, worth nearly \$13,500,000, with Bunker Hill and ASARCO the major producers. Bunker Hill upped production capacity of its electrolytic zinc plant 25 percent by placing a fifth unit into operation.

A new open pit mine was developed to augment underground production at Calera Mining Company's Blackbird unit at Cobalt, Idaho. The stripping, done under contract by Isbell Construction Company, was underway in June 1957. Stripping ratio at the open pit is 11 to 1. The ore to be mined by open pitting was discovered following a great deal of geological and geophysical work. It is

thought to represent a faulted and offset extension of a mineralized structure which has hosted other ore bodies at Calera.

The nation's leading silver producing state increased output 12 percent to approximately 15,100,000 ounces, valued at about \$13,700,000. Sunshine Mining Company was the No. 1 producer again by a substantial margin. Silver replaced zinc as runner-up to lead for value of production.

Cathode antimony metal, totaling 661 tons, was produced by Sunshine Mining Company which obtained a government contract for \$1,000,000 worth in the two-year period ending June 30, 1959. Bradley Mining Company completed dismantling of its big antimony smelter at Stibnite, Valley County, closed in 1952 and reopened late in 1955 to remove arsenic from metal purchased from Sunshine.

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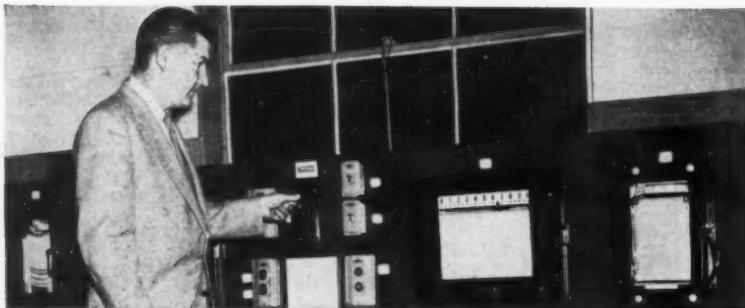
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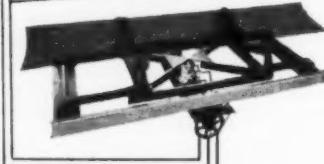
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**Idaho Production of Gold, Silver, Copper, Lead, Zinc, Phosphate, Mercury, and Tungsten 1941 to 1957. Dollar Value for Base and Precious Metals**

Year	Phosphate Long Tons	Mercury Flasks	Tungsten Conc. 60 percent WOs Tons	Gold Ounces	Silver Ounces	Copper Tons	Lead Tons	Zinc Tons	Dollars Value
1941	97,274	NA	663	149,816	16,672,410	3,621	104,914	79,084	\$41,776,848
1942	115,263 <sup>1</sup>	NA	2,132	95,020	14,644,890	3,430	113,909	87,256	46,063,326
1943	108,916	4,261	4,878	30,808	11,700,180	2,324	96,457	86,707	43,199,910
1944	112,565	1,332	3,957	25,008	9,931,614	1,688	83,530	91,372	42,591,137
1945	123,340	627	2,130	17,780	8,142,667	1,548	68,447	83,463	37,799,975
1946	312,658 <sup>2</sup>	868	641	42,975	6,491,104	1,038	59,987	71,507	37,610,123
1947	845,045	886	61	64,982	10,345,779	1,640	78,944	83,069	55,164,670
1948	434,375	543	86	58,454	11,448,875	1,624	88,544	86,267	67,758,290
1949	471,305	—	66	77,829	10,049,257	1,438	79,299	76,555	56,429,796
1950	573,044	—	222	79,652	16,095,019	2,107	100,025	87,890	70,198,647
1951	695,026	357	377	45,064	14,753,023	2,160	76,713	78,121	70,953,653
1952	620,551	887	333	32,997	14,923,165	3,213	73,719	74,317	64,626,967
1953	1,001,969	NA	441	17,630	13,636,680	2,100	69,885	68,650	47,729,814
1954	1,092,817	—	450	13,245	15,867,414	4,328	69,302	61,528	49,951,702
1955	1,329,959	1,107	642	10,572	13,831,458	5,618	64,163	53,314	49,315,034
1956	1,438,151	3,594	582	9,210	13,471,916	6,656	64,321	49,561	51,949,222
1957 <sup>1</sup>	1,400,000	2,200	38	11,850	15,148,900	7,555	70,225	58,642	52,370,730

1. Estimated by U. S. Bureau of Mines. NA Not available.

Phosphate rock output declined 3 percent to 1,400,000 tons valued at \$6,560,000. Producers were the Anaconda Company and Monsanto Chemical Company in Caribou County; J. R. Simplot Co., Bingham and Clark Counties, and San Francisco Chemical Company, Bear Lake County. Central Farmers Fertilizer Company let contracts for construction of a phosphate processing plant at Georgetown, Bear Lake County.

During the year, Holly Minerals Corporation conducted considerable experimental work on a new method of recovering mercury from ore. The process involves flotation, leaching and electrolytic deposition. Chief advantage is that arsenical or antimonial, mercury ore can be treated. Construction started on a 200-ton-per-day mill at Holly's Hermes mine during the year, and it should be ready early this year.

Substantial increases in Columbite-tantalite output were made by Porter Bros. Corporation in Bear valley dredging operations, Valley County.

Though Erie only shipped 112,537 tons from its Taconite Harbor facilities in 1957, rated capacity is 7,500,000 tons of finished pellets per year. Full capacity operation is expected to be attained in the first half of 1958. Another producer of taconite concentrate was Oliver Iron Mining Division of United States Steel Corporation from the Pilotac mine and

**Michigan Production of Copper and Iron Ore from 1941 Through 1957.**

Year	Copper Tons	Iron Ore Long Tons
1941	46,440	15,201,619
1942	45,679	16,129,474
1943	46,764	14,510,357
1944	42,421	15,425,788
1945	30,401	11,865,624
1946	21,663	8,756,802
1947	24,184	12,965,482
1948	27,777	12,896,478
1949	19,506	11,199,024
1950	25,608	12,691,101
1951	24,979	13,703,901
1952	21,699	11,779,366
1953	24,097	14,326,074
1954	23,593	9,709,167
1955	50,066	14,143,509
1956	61,526	12,536,009
1957 <sup>1</sup>	58,750	12,882,000

1. Estimated by U. S. Bureau of Mines. mill. Pilotac concentrate was sintered and nodulized at Oliver's Exacta plant.

Several new plants and mines were placed into production during 1957. Among these are: Oliver's Stephens Mine at Aurora; Jones and Laughlin Corporation's Arthur re-treat flotation plant at Calumet; and Pickands Mather and Company's Mahoning Plant at Hibbing. In addition Cleveland-Cliffs Iron Company commenced treatment and beneficiation of underground ores at its Ore Improvement plant at Negauane, Michigan. The Mahoning plant and the Ore Improvement plant utilize the heavy media separation.

Jones and Laughlin's flotation plant introduced a new process on the Mesaba Iron Range. This plant is retreating tailings from the Hill Annex plant of this company. Reclamation from the tailing

pond is done by hydraulic dredge and beneficiation is accomplished by spirals and froth flotation.

Development work including extensive drilling for iron ore near Butternut, Wisconsin was continued by Wisconsin Mining Company and Jones and Laughlin Steel Corporation. Stripping operations were activated at M. A. Hanna's Pierce Group Mines near Hibbing; Jones and Laughlin's Lind Greenway Mine near Grand Rapids, Minnesota; M. A. Hanna's Roberts Mine and Musser Mine on the Cuyuna Range.

M. A. Hanna commenced construction of the Groveland plant near Iron Mountain, Michigan. This plant will beneficiate ores comparable to those being treated at the Humboldt and Republic plants of Cleveland-Cliffs Iron Company. Operation of Groveland is scheduled for the fall of 1958; the plant consists of spirals and flotation for upgrading of specularites.

Highlight of the 1957 season was the celebration commemorating the 50th Anniversary of beneficiation of iron ores in Minnesota. The first treatment plant was the Trout Lake plant of Oliver Iron Mining Company which was placed in operation in 1907. On August 15, 1957, twenty-two plants were opened for public inspection by the various mining companies.

Copper production in Michigan tapered off very suddenly following the collapse of the domestic value during the entire year. White Pine Copper continues to process 12,000 to 16,000 tons-per-day but Calumet and Hecla, and Quincy Mining Company have made cutbacks in production schedules.

United States Metals Refining Company has completed its copper exploration drilling on 20,000 acres near Wakefield, Michigan. On the basis of 132,000 feet of diamond drilling, estimates indicate a deposit of 50,600,000 short tons of copper-bearing shale averaging 1.52

**Minnesota Shipments and Average Iron Content of Usable Ore<sup>1</sup> 1946 to 1957**

Year	Long Tons	Content %
1946	49,055,340	51.48
1947	62,436,102	50.99
1948	67,923,237	49.86
1949	55,943,714	50.25
1950	64,538,759	49.37
1951	78,164,527	50.53
1952	63,906,069	50.16
1953	80,533,670	50.31
1954	48,613,338	50.94
1955	69,419,334	50.65
1956	62,637,317	51.49
1957 <sup>2</sup>	68,083,000	NA

1. Exclusive of ore containing 5 percent or more manganese. 2. Estimate by U. S. Bureau of Mines. 3. NA—Not available.

## Lake Superior District

### Erie Taconite Plant Tuned-Up; Copper Orebody Outlined on Michigan Peninsula

Iron ore production in the Lake Superior District during 1957 exceeded 1956 production by a considerable amount. Total shipments of usable iron ore for 1957 were 84,614,734 long tons compared to 77,633,027 long tons for 1956.

Taconite concentrate output amounted to nearly 6,000,000 gross tons during the year. Reserve Mining Company contributed 5,018,565 tons of this total. Erie Mining Company, Minnesota's second large-scale taconite plant, was put into operation in the latter part of 1957.

### Wisconsin Production of Iron Ore, Lead, and Zinc From 1950 Through 1957

Year	Iron Ore Long Tons	Lead Tons	Zinc Tons
1950	532	5,722	
1951	1,745,120	1,391	15,754
1952	1,485,845	2,000	20,588
1953	1,653,331	2,094	16,830
1954	1,428,910	1,261	15,534
1955	1,886,029	1,948	18,326
1956	1,488,361	2,582	23,890
1957 <sup>1</sup>	1,568,000	2,030	22,130

1. Estimated by U. S. Bureau of Mines.

### Please Turn To

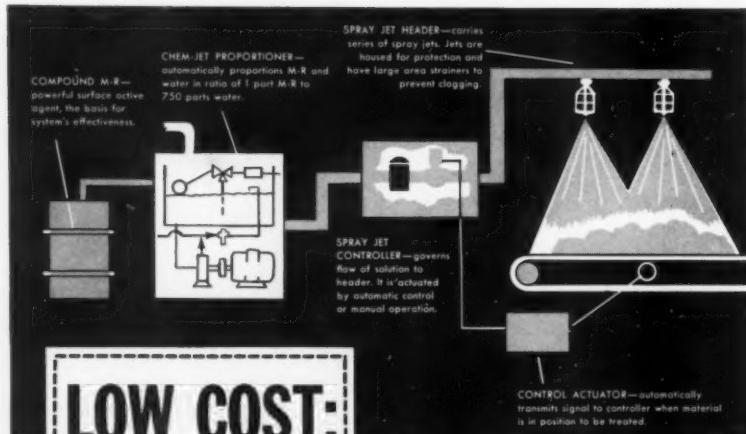
Page 224 for charts showing U. S. mine production of key metals from 1900 to 1958.

Page 221 to check Minnesota, Michigan, and Wisconsin mine shipments of iron ore.

Page 222 for listing of tonnages mined at important U. S. open pit mines.

Page 223 to see the rank of the major underground U. S. mines.

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**Montana Production of Metals and Minerals From 1941 Through 1957. Dollar Values Shown For Base Metals Only**

Year	Tungsten Conc. 60% WO <sub>3</sub> Tons	Manganese* 35% or More Mn Tons	Chromite* Tons	Fluorspar Tons	Gold Ounces	Silver Ounces	Copper Tons	Lead Tons	Zinc Tons	Dollar Value
1941	7	43,555	—	—	246,475	12,386,925	128,036	21,259	60,710	\$ 59,181,627
1942	—	120,409	65,238	—	146,892	11,188,118	141,194	20,050	54,715	60,129,853
1943	1	130,789	75,691	—	59,586	8,450,370	134,523	16,324	37,606	53,642,658
1944	25	153,665	1,251	—	50,021	7,093,215	118,190	13,105	36,127	49,039,855
1945	—	143,888	—	—	44,597	5,942,070	88,506	9,999	17,403	35,405,505
1946	84	129,227	—	—	70,507	3,273,140	58,481	8,280	16,770	29,957,206
1947	4	123,490	—	—	90,124	6,326,190	57,900	16,108	45,679	48,890,964
1948	—	119,339	—	318	73,091	6,930,716	58,252	18,411	59,095	56,422,609
1949	9	107,399	—	422	52,274	6,327,025	56,611	17,996	54,195	49,003,447
1950	—	119,694	—	41	51,764	6,590,747	54,478	19,617	67,678	54,956,689
1951	—	91,080	—	—	30,502	6,393,768	57,406	21,302	75,888	73,149,813
1952	1	90,772	—	16,160	24,161	6,138,185	61,948	21,279	82,185	70,521,092
1953	14	113,429	26,089	5,932	24,768	6,690,000	77,617	19,949	80,271	75,162,000
1954	678	NA	NA	15,102	23,660	5,177,942	59,349	14,820	60,952	57,736,621
1955	1,211	106,026	118,703	25,223	28,123	6,080,390	81,542	17,028	68,588	89,264,689
1956	1,230	80,553	118,780	59,775	38,121	7,385,908	96,426	18,642	70,520	115,157,023
1957 <sup>1</sup>	NA	NA	119,371	NA	27,910	5,114,050	90,896	13,328	49,790	75,433,088

\* Gross weight short tons. 1. Estimate by U. S. Bureau Mines.

percent copper and an additional 54,-000,000 short-tonns of lower-grade shale averaging 1.04 percent copper. This deposit is in the same formation that hosts the ore body of White Pine Copper Company.

## Montana

### • Berkeley and Kelley Hold Copper Output High; Iron Deposits Look Promising

The total value of minerals, including mineral fuels, produced in Montana during 1957 by U. S. Bureau of Mines estimates was approximately \$184,000,000. This figure is about 14 percent lower than the all time high of \$213,728,000, in 1956. The decrease in value per unit of metal was the main reason for this decrease, however reduced production of metals accomplished by metal-mine closures and production cut backs in Silver Bow County (Butte) was likewise a contributing factor. The value of minerals produced in Silver Bow County in 1957 was \$71,900,000 compared to \$111,100,000 in 1956.

The Anaconda Company closed several of its Butte mines in the middle part of the year. Only the Anselmo (zinc), Emma (manganese), Leonard (copper), and Kelley (copper) underground mines and the Berkeley (copper) open pit mine were in production at year's end. Work on the Northwest project, involving the sinking of two shafts and considerable other underground development work to tap ores at depth was suspended temporarily to await improvement in metal prices. Employees were put on a five-day week basis and the resulting shutdowns and work-week reductions reduced the working force in excess of 2,000 employees. However, with this labor reduction, copper production (tonnage) was only down six percent from the 1956 figure mainly because of ore flowing from the Berkeley pit.

Production from the Kelley mine was maintained at a rate of approximately 15,000 tons of ore per day throughout the year. Production at the Berkeley pit reached 17,500 tons of ore per day in mid 1957, and this rate was maintained throughout the remainder of the year. Work progressed on an inclined conveyor tunnel extending from a railroad ore-loading yard to the bottom of the Berkeley pit. The crusher will be located under a part of the pit from which the crushed ore will be transported by conveyor belt to ore bins beside the railroad. An unusual feature of

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All of the reported uranium ore shipments from Montana came from the Pryor Mountain area of Carbon County which lies south of Billings. This district extends into Wyoming.

Iron ore was again produced in Montana by the Young-Montana Corporation which mined high-grade magnetite and shipped it to Great Lakes furnaces.

Manganese production figures remained about the same as for 1956 with the Emma mine in Butte accounting for the major portion of the output. However, many small producers in the Butte, Philipsburg, and White Sulphur Springs area again contributed to this total in 1957. The government program for buying manganese ore was extended in this area until mid-1958.

The amount of chromite produced in 1957 was about the same as for 1956. All of the chromite was mined by the American Chrome Company in its operations near Nye. The company sunk a shaft in 1957 and actively pursued an extensive development program to prove ore reserves at depth.

For the most part, non-metallic production figures were similar to those of 1956. Flourspar production increased slightly, and Cummings & Roberts, main producers in Ravalli County, built a beneficiation plant. Phosphate production also increased with Victor Chemical Company, Montana Phosphate Products Company, J. R. Simplot Company, and George Relyea accounting for practically all of the production. This ore was produced from both open pit and underground operations.

## Nevada

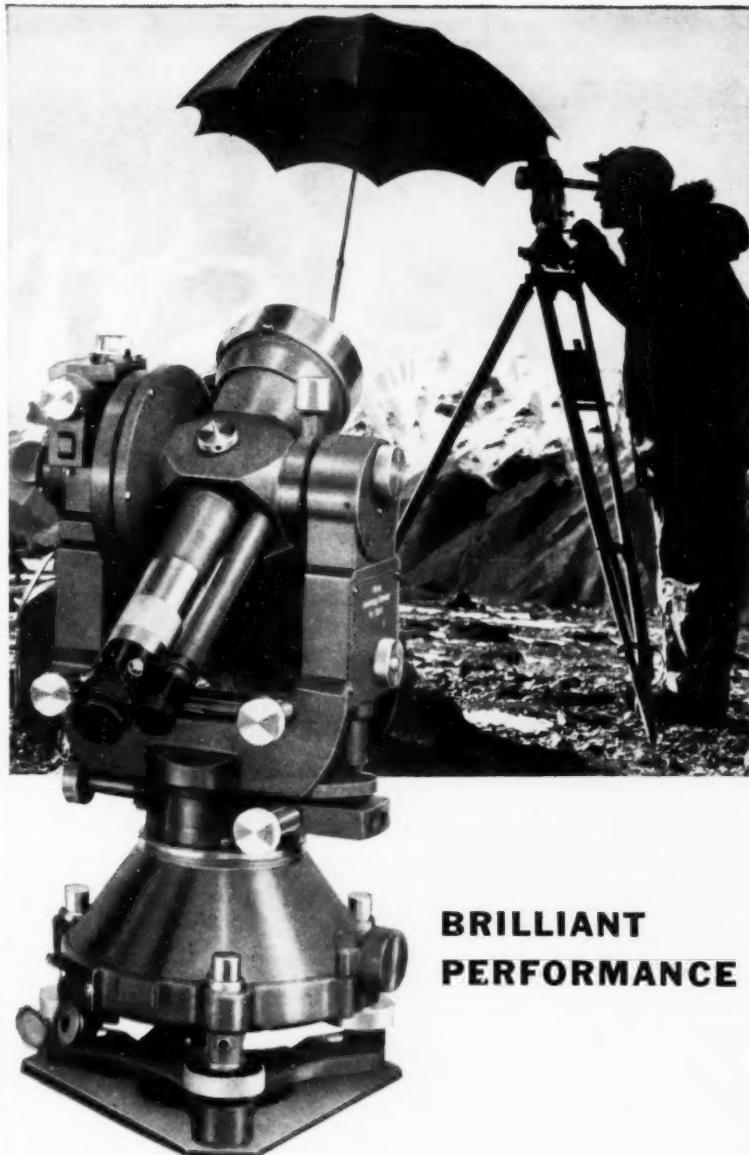
### ● Consolidated Coppermines Sold to Kennecott; Big Gold Mining Project Shapes-Up

The value of Nevada's 1957 mineral production dipped steeply below the all-time high of \$126,235,000 recorded in 1956. Preliminary estimates place the 1957 mine output at \$83,411,000.

Copper production declined from 82,883 tons in 1956 to 77,000 tons in 1957. Perhaps a more accurate reflection of the picture can be gained from copper production rates during the year. Copper was produced at a rate of 7,060 tons in January 1957, but by December of the year copper production had slowed to 6,020 tons per month.

The most significant event of 1957 was the negotiation between Kennecott Copper Corporation and Consolidated Coppermines Corporation for the purchase by Kennecott of Coppermines' holdings in White Pine County. After the start of the new year, Kennecott completed the purchase which included Consolidated Coppermines' Tripp open pit; Coppermines' share of ore reserves in Kennecott's adjacent Liberty and Veteran pits; and numerous Consolidated Coppermines claims, surface buildings, water rights and equipment. Both companies had worked side by side for years.

In the Yerington District, Nevada's only other major copper producer, The Anaconda Company at Weed Heights, continued treating oxide copper ore in its leaching plant. Estimated Anaconda



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**New Mexico Production of Potash, Gold, Silver, Copper, Lead, and Zinc and Dollar Value from 1941 Through 1957 For Base Metals Only**

Year	Potassium Salts K.O. Equivalent Tons	Gold Ounces	Silver Ounces	Copper Tons	Lead Tons	Zinc Tons	Dollar Value
1941	433,677	27,845	1,328,317	73,478	4,668	37,862	\$25,471,416
1942	548,730	11,961	676,170	80,100	4,608	46,461	29,542,885
1943	604,414	5,563	463,583	76,163	5,723	59,524	34,042,378
1944	679,721	6,918	535,275	69,730	7,265	50,727	32,178,026
1945	733,176	5,604	465,127	56,571	7,662	40,295	26,386,781
1946	789,473	4,009	338,000	50,191	4,899	36,103	26,552,417
1947	880,605	3,146	515,833	60,205	6,383	44,103	38,374,269
1948	967,945	3,414	537,674	74,687	7,653	41,502	46,799,576
1949	932,497	3,249	380,855	55,388	4,652	29,346	31,029,120
1950	1,072,722	3,414	338,581	66,300	4,150	29,263	37,437,915
1951	1,217,717	3,959	443,267	73,558	5,846	45,419	54,697,048
1952	1,411,125	2,949	479,318	76,112	7,021	50,975	56,559,692
1953	1,562,831	2,614	205,000	72,477	2,943	13,373	45,725,959
1954	1,732,240	3,539	109,132	60,558	887	6	36,196,189
1955	1,826,118	1,917	251,072	66,417	3,296	15,277	54,581,760
1956	1,930,734	3,257	392,967	74,345	6,042	35,010	75,153,458
1957 <sup>1</sup>	2,028,000	3,600	311,400	65,500	5,350	30,900	48,355,600

1. Estimate by U. S. Bureau Mines.

copper production of \$17,000,000 during 1957 was substantially below the approximate \$25,000,000 output recorded by Anaconda in both 1955 and 1956.

Increased interest was shown in gold properties throughout the state. Largest undertaking was that of Round Mountain Gold Dredging Corporation, Fresno Company subsidiary, on property leased from Nevada Porphyry Gold Mines, Inc. in Nye County. Morrison-Knudsen is stripping 33,155,000 yards of overburden from the placer deposit to develop an estimated 38,722,000 yards of ore. Remodeling and expansion of the Round Mountain mill was started in order to handle approximately 250,000 yards of \$0.75 to \$1.00 gold ore per month. Milling was reported to have started in March 1958.

Both lead and zinc production was down. Combined Metals Reduction Company, Nevada's leading lead-zinc producer in 1957 and former years, ceased mining operations in the Pioche District in August 1957. Important lead tonnage was recovered from the Ruby Hill mine of Eureka Corporation and Consolidated Eureka Mining Company in Eureka county. Both companies produce a relatively high-grade lead-silver ore, and so far have been able to continue output on a limited scale.

Iron ore production declined 165,000 tons in 1957 compared to 1956 output. Mineral Materials Company began operation of a 300-ton-per-hour dry magnetic separation plant near Lovelock. Shipments of manganese ore and concentrate rose above the 1956 level. Manganese Inc. was the largest producer. Producers from White Pine County and Combined Metals Reduction Company, Pioche District, shipped ore to the Butte purchase depot.

Mercury output was up a few hundred flasks. Cordero Mining Company was the major producer. Interest in mercury flotation grew during the year. The tungsten industry virtually collapsed with the closing of the domestic purchase program. Only Nevada-Massachusetts Company and Gabbs Exploration were reported actively mining and milling tungsten ore at years end. In 1956, 139 producing tungsten properties were listed.

Basic Incorporated, one of the Nation's largest magnesite producers, planned a \$1,500,000 expansion and improvement of facilities at Gabbs. Magnet Cove Barium Corporation completed installation of barite flotation and pulverizer additions to the Battle Mountain plant.

## New Mexico

● Major Discoveries Make this Largest U<sub>3</sub>O<sub>8</sub> State; Sink 14 Ambrasia Shafts

During 1957 New Mexico increased its position as the number one uranium state in terms of discoveries, tonnage of ore developed, mill tonnage under construction, and tons of ore mined. This activity was centered in the greater Laguna-Grants-Ambrosia Lake district. The Ambrosia Lake district was extended southeast, east, west, and northwest by drilling, much of it deep, during the year Grants-Ambrosia Lake district. The Ambrosia Lake district was extended southeast, east, west, and northwest by drilling, much of it deep, during the year with major ore discoveries made or announced by Calumet & Hecla, Inc.; Rare Metals Corporation of America; Four Corners Exploration Company; Phillips

Petroleum Company; Yucca Mining & Petroleum Company; Mineral Project Venture B; and others. Extensions to previously discovered ore bodies were also made by drilling by the larger operators. The Atomic Energy Commission announced on 20 November that reserves totaled 51,400,000 tons of 0.26 percent U<sup>3</sup>O<sub>8</sub> ore. This was about 68 percent of United States reserves.

At year's end Anaconda Company was operating its 3,000 ton Bluewater mill at over capacity treating Jackpile open pit sandstone ore and limestone ore from mines north of the mill. Kerr-McGee Oil Industries, Inc. operated its 500 daily ton solvent extraction mill at Shiprock throughout the year treating company and custom ore (some from southern end of Ambrosia Lake). Four mills were being rushed to completion with the Homestake-New Mexico Partners 750 ton mill scheduled to start early in 1958 to treat Rio de Oro Uranium Mines Inc., and Homestake-Partners Section 32 mine ore. Homestake-Sapin Partners new 1,500 ton mill and Phillips Petroleum Company's 1,750 ton mill are scheduled for mid-1958 operation. The 3,300 ton Kermac Nuclear Fuels Corporation mill which will be world's largest producer is scheduled for operation in early 1959. At year's end 14 major shafts were being sunk in Ambrosia Lake to develop mines to supply ore for these four new mills.

Kennecott Copper Corporation's Chino Mines Division started major plant improvements during the year to reduce costs and raise efficiency. A 16,500 kilowatt hour steam turbine generation plant was under construction and new equipment purchased for the pit. Stripping was started to develop the Niagara ore body near Santa Rita pit. Chino Mines continued as largest copper and molybdenum producer.

Production of potash salts in the Carlsbad district reached an all time high of just over 2,000,000 tons during the year by the six producing mines. The record was made possible by the new mine of National Potash Company (Freeport Sulphur Company-Pittsburg Consolidation Coal Company). The Farm Chemical Resources Development Corporation completed its first shaft late in the year and started pilot plant testing of ore cut by the shaft. Potash Company of America was building two new plants at its refinery to produce granular potash products. International Minerals & Chemicals Corporation also added equipment to increase granular capacity and installed new mining equipment. Other potash producers were: Duval Sulphur and Potash Company, Southwest Potash Company, and U. S. Borax and Chemical Corporation.

## Nevada Production of Metals From 1941 Through 1957. Dollar Value Shown For Base Metals Only

Year	Iron Ore Long Tons	Manganese 35% or More Mn Tons*	Tungsten 60 Percent WO <sub>3</sub> Tons	Gold Ounces	Silver Ounces	Copper Tons	Lead Tons	Zinc Tons	Dollar Value
1941	241	2,937	2,289	366,403	5,830,238	78,911	9,623	15,129	\$38,959,420
1942	—	6,112	3,052	295,112	3,723,435	83,663	5,378	10,197	35,840,168
1943	7,368	10,451	2,910	144,442	1,620,280	71,068	4,790	15,647	28,351,601
1944	36,581	19,800	2,665	119,056	1,259,656	61,232	6,605	20,699	27,314,513
1945	6,196	874	1,857	92,265	1,043,380	52,593	6,275	21,457	24,186,294
1946	3,299	1,067	2,617	90,680	1,250,651	48,616	7,175	22,049	22,026,416
1947	5,452	67	2,002	89,063	1,337,579	46,603	7,161	16,970	31,366,282
1948	8,945	—	949	111,532	1,790,010	45,242	9,777	20,288	34,055,480
1949	3,004	—	740	130,399	1,869,399	59,058	10,626	20,443	29,615,777
1950	5,465	—	1,3	1,347	1,537,217	52,569	9,508	21,606	38,181,872
1951	311,327	58	1,482	121,036	981,669	56,474	7,148	17,443	41,280,596
1952	914,444	105	2,329	117,203	941,195	57,537	6,790	15,357	40,086,746
1953	444,081	20,510*	3,233	101,799	697,086	61,850	4,371	5,812	42,177,725
1954	351,250	88,220*	4,606	79,067	560,182	70,217	3,041	1,035	45,759,162
1955	324,602	102,000*	6,155	72,913	845,397	78,925	3,291	2,670	63,832,670
1956	916,592	121,482	5,400	72,646	1,220,473	82,883	6,384	7,488	78,154,038
1957 <sup>1</sup>	751,000	129,000	1,400	73,400	952,700	77,700	5,800	5,000	52,941,600

1. Estimated by U. S. Bureau of Mines; \* Long tons;

2. Shipments to Government low-grade depots and custom mills not included.

# Oregon

## ● Metallurgical Industry Is Still Growing; Uranium Mill Construction Approved by AEC

Oregon's growing metallurgical industry could boast two new developments in 1957. First, Oregon Metallurgical Corporation announced that the company had been awarded a \$4,000,000, one year contract for production of ingots of zirconium metal for delivery to Westinghouse Electric Corporation. Raw material will be sponge zirconium metal supplied by Wah Chang Corporation. Second, Wah Chang officially dedicated its new zirconium sponge plant at Albany last year; about a month later Wah Chang started building a zirconium purification addition to the sponge plant.

Uranium made the news in Oregon during 1957 with the announcement in October of A. E. C. approval for construction of a 200-ton-per-day processing plant near Lakeview, Oregon by Lakeview Mining Company. Anticipated cost of the plant is \$2,600,000.

About 1,000,000 tons of nickel ore was mined by open-pit methods by Hanna Coal and Ore Corporation near Riddle, Douglas County. The ore averaged about 1.5 percent nickel. The nearby smelter of Hanna Nickel Smelting Company turned out some 41,000,000 pounds of ferronickel, highest since the plant went into operation, containing 18,000,000 pounds of nickel. Late in the year the smelter upped capacity of its ore preparation system by one-third.

Mercury production was estimated at 3,870 flasks, more than double the 1956 figure and the highest since 1943. Under the management of Arentz-Comstock Mining Venture of Salt Lake City, the old Bretz mine in Malheur County's Opalite district came back after a 10-year shutdown to rank as the state's leading producer.

# South Dakota

## ● Homestake Drives Deeper; Solvent Extraction Unit To Be Installed at Edgemont

Production of metal ore in 1957 just about held its own with respect to 1956 output. Homestake Mining Company at Lead increased production of gold and silver from its underground mine slightly; the production of Bald Mountain Mining Company, near Lead, declined considerably. The net result was a 2 percent drop in gold and a 6 percent drop in silver production for the state in 1957.

Development work continued below the 5,000-foot level at Homestake's famous producer. An interior winze was sunk to the 5,705-foot mark and drifts are being advanced along the ore zones on the 5,300- and 5,600-foot levels. Two-stage hoisting will be required for production originating below the 5,000-foot level, and this will probably contribute to somewhat higher costs. Work continued on a ventilation shaft which is being sunk from the surface and raised from underground workings.

Production of uranium ore in 1957 was estimated to be nearly 3 times greater than in 1956. Mines Develop-

Oregon Production of Nickel, Mercury, Chromite, Gold and Silver. Dollar Value of Gold and Silver Output Given for 1941 Through 1957

Year	Nickel Tons*	Mercury Flasks	Chromite Tons	Gold Ounces	Silver Ounces	Dollar Value
1941	9,032	840		96,525	276,158	\$3,576,154
1942	6,936	2,683		46,233	87,376	1,680,289
1943	4,651	16,363		1,097	10,527	45,878
1944	3,159	7,818		1,369	20,243	62,310
1945	2,500	4,366		4,467	10,461	163,874
1946	1,326	NA		17,598	6,927	621,527
1947	1,185	—		18,979	30,379	691,758
1948	1,351	3,345		14,611	13,596	523,690
1949	1,167	—		16,226	12,195	578,947
1950	5	—		11,058	13,565	399,307
1951	1,177	754		7,927	6,218	283,073
1952	868	6,591		5,509	4,037	196,469
1953	648	6,216		8,250	6,930	295,022
1954	1,993	491		6,665	6,520	14,335
1955	4,181	1,056		5,341	1,708	8,815
1956	6,866	1,893		54,577	2,738	13,542
1957	15,000	3,870		7,800	(3)	(4)

1. Estimated by U. S. Bureau of Mines. 2. Nickel content of ore.

3. Production not available, but estimated to be greater than 1956.

4. Production not available, but estimated to be greater than 1956.

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**South Dakota Production of Gold, Silver, Feldspar, and Beryllium from 1941 Through 1957. Dollar Value for Gold and Silver only.**

Year	Feldspar (Crude) Long Tons	Beryllium Conc. Tons	Gold Ounces	Silver Ounces	Dollar Value
1941	59,015	151	600,637	170,771	\$21,143,732
1942	56,449	205	522,098	186,937	18,406,363
1943	70,913	238	106,444	35,886	3,751,059
1944	64,806	306	11,621	5,445	410,607
1945	57,574	38	55,948	26,564	1,977,070
1946	74,100	95	312,247	86,901	10,998,861
1947	58,959	70	407,194	111,684	14,359,766
1948	54,337	45	577,850	94,693	13,323,894
1949	52,272	69	464,650	109,583	16,363,011
1950	41,875	96	567,996	142,069	20,008,436
1951	48,559	138	458,101	139,590	16,159,871
1952	40,163	334	482,534	132,102	17,008,249
1953	50,601	392	581,087	138,642	18,850,025
1954	44,498	337	541,445	151,407	19,087,606
1955	42,164	294	520,865	154,092	19,109,068
1956	45,164	195	568,523	136,118	20,310,537
1957 <sup>1</sup>	40,000	260	556,400	128,000	20,195,660

1. Estimated by U.S. Bureau of Mines.

ment, Inc. completed the first full year of operation of its RIP uranium plant at Edgemont. Initially designed to treat 200 tons of ore per day, mill feed consistently exceeded 400 tons per day in 1957. The excess tonnage was allowed under a special agreement with the Atomic Energy Commission. Subsequently Mines Development received AEC permission to permanently expand capacity to 400 tons per day. An important addition to the expansion program will be the installation of a solvent extraction unit.

A partial list of shippers to the Edgemont mill include Anschutz Drilling Company, Giant Cycle Corporation, Black Hills Uranium Company, Jenkins and Hand, Sodak Uranium & Mining

Company and Pictograph Mining & Uranium, Inc.

Output of beryllium concentrate and columbium-tantalum concentrate rose sharply in 1957. At the Ingersoll Mine, near Keystone, development work was carried out on a third pegmatite dike, and a fourth pegmatite was diamond drilled. Principal production from two dikes mined in the past has consisted of lepidolite, amblygonite and beryl.

**North Carolina Production of Feldspar and Tungsten From 1950 through 1957**

Year	Feldspar Long Tons	Tungsten Conc. (60% WO <sub>3</sub> ) Tons
1950	183,027	1,088
1951	166,361	1,041
1952	240,364	1,254
1953	268,062	2,538
1954	230,744	2,609
1955	242,724	2,732
1956	255,637	2,528
1957 <sup>1</sup>	261,000	

1. Estimated by U.S. Bureau of Mines.

In the Florida phosphate field, American Cyanamid Company started a new triple superphosphate plant at Brewster. The company also started the Orange Park operation and closed the Saddle Creek mine. Coronet Phosphate Company enlarged potassium silicofluoride facilities. Armour Fertilizer Works completed its second year of mining at the new Bartow mine.

During the year Union Carbide Corporation announced that it would use a 9-cubic-foot, connected bucket-line dredge to recover heavy minerals from sands of Amelia Island off Florida's east coast. Rutile and ilmenite concentrates will be used to produce titanium sponge at Ashtabula, Ohio.

Lithium continued to be a quite active phase of the mining industry of North Carolina. Foote Mineral Company continued to be the major producer of concentrates, and the only company actively mining ore in the State. Lithium Corporation of America continued to receive its mill feed from Canada. The greatest activity was by other groups interested in developing idle deposits, and considerable surface and subsurface exploration was done by Basic Atomics, Inc., Lincoln Lithium Corporation, Universal Lithium Corporation, and National Lithium Corporation.

Production capacities of the feldspar industry in North Carolina were increased considerably with the completion of Lawson Feldspar Corporation's plant near Spruce Pine. This plant is to produce feldspar concentrates from asbestos.

Perhaps the most significant development in North Carolina was the exploration program for phosphate in Beaufort County, eastern North Carolina. Bear Creek Mining Company and General Crude Petroleum Company have drilled enough holes to indicate that large deposits of medium to low grade phosphate exist in the area. So far the deposits have been traced from 45 to more than 250 feet below the surface.

In Alabama, shipments of iron ore increased 6 percent over 1956 to 13,030,000 long-tonns.

## Tri-State

**● Lead and Zinc Output Take A Steep Dive; Many Producers Forced To Close**

Output of recoverable lead fell from 20,400 tons in 1956 to 10,800 tons in 1957. The 1957 production was the lowest recorded since the 1880's. Zinc presented a similar pattern. Recoverable zinc production in the district amounted to

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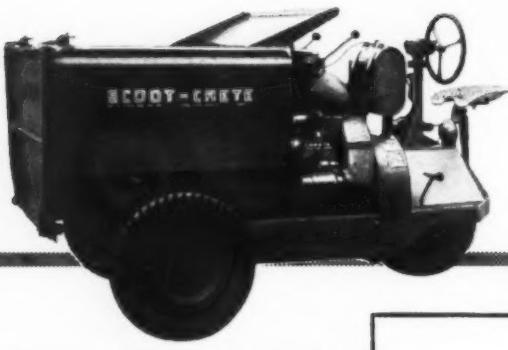
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**Florida Production of Phosphate Rock, and Titaniferous Minerals (Ilmenite, rutile and zircon) From 1950 through 1957**

Year	Phosphate Rock Long Tons	Titanium Minerals Tons
1950	8,085,870	(2)
1951	8,496,831	(2)
1952	8,781,125	(2)
1953	9,331,002	178,818
1954	10,437,197	182,421
1955	8,747,282	238,500
1956	11,822,145	283,956
1957 <sup>1</sup>	10,599,000	268,479

1. Estimated by U.S. Bureau of Mines.





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F 4 L 612	40/2000
F 6 L 612	60/2000
A/F 2 L 514	30/1600
A/F 3 L 514	45/1600
A 4 L 514	60/1800
A 6 L 514/614	90/1800
A 8 L 614	120/1800
A 12 L 614	180/1800

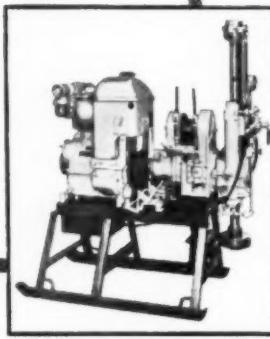
Also a full range of automotive engines with 4, 6, 8 and 12 cylinders operating at 2300 RPM.

consolidate all flotation operations at London mill, was nevertheless brought to near completion in 1957. The Calloway mine, under development for several years, is being equipped for full-scale production beginning about the middle of 1958.

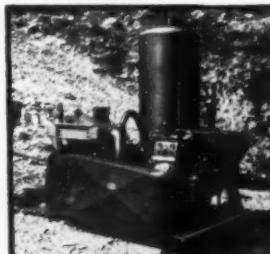
The big area of exploration during 1957 was still the East Tennessee zinc district, where nearly \$3,000,000 was spent on Defense Minerals Exploration Administration projects. In addition, Tennessee Coal and Iron Company, a subsidiary of United States Steel, has 7 diamond drills involved in exploration without D.M.E.A. assistance.

National Lead Company bought the options of Putman Exploration Company near New Jersey Zinc Company's Flat Gap Zinc mine and continued diamond drilling on the basis of geo-chemical anomalies. D.M.E.A. assisted National Lead in this exploration program with an \$85,063 loan.

Production of phosphate ore in Central Tennessee slipped slightly to 1,635,000 tons from the record high of 1,685,003 tons established in 1956. Tennessee Products Company, principally a producer of ferrosilicon, closed down one of its two blast furnaces. This resulted in a 20 percent decline in limonite ore supplied to the plant.



LONGYEAR mineral exploratory drilling machine with Deutz Aircooled Diesel Engine Unit uses Longyear Diamond Core Drill #24. Longyear selected Deutz for its compactness of design, fuel efficiency and excellent service and parts facilities.



Mine installation at Rock Springs, Arizona, uses ATLAS COPCO Compressor CT-6 with Deutz-6 cylinder A 6L/514 engine to assure top running efficiency in all temperatures. The semi-portable compressor provides 320 C.F.M.

## Utah

**•  $\text{U}_3\text{O}_8$ , Potash, Gilsonite and Phosphate attract Attention; Kennecott Begins Pyrite Study**

Metal output, though plummeting 26 percent, still accounted for 75 percent of the mineral output of Utah in 1957. Non-metallics were the bright spot in the picture with many new developments taking place during the year and several others planned for the future.

Copper again was the leading mineral commodity; 1957 production totalled 233,800 tons compared to 250,604 tons in 1956. Kennecott Copper Corporation, Utah Copper Division announced an \$18,000,000 improvement program. Of this amount \$16,000,000 will be spent for expansion of the company's central power station at Magna. Utah Copper pushed activities on an 18-by 24-foot haulage tunnel to connect the bottom of the Bingham Canyon open pit with the Copperton railroad assembly yards. The tunnel is to be concrete-lined and will be about 18,000 feet long when completed. Utah Construction Company is driving the heading under contract.

Recoverable lead production fell about 5,000 tons to a 44,000-ton output in 1957. United States Smelting Refining and Mining Company, operator of the U. S. and Lark mine at Bingham, was again the largest producer by far. Centennial Development Company sunk a 1,000-foot shaft in the Tintic District under contract for Bear Creek Mining Company. A Cryderman mucker was used in the shaft. The shaft provides depth for silver-lead-zinc exploration by Bear Creek. In November 1957 the shaft was bottomed and 200 feet of advance had been made toward a core drill hole which reportedly had cut ore. Bear Creek is doing the exploration under a working agreement with a group of five companies in the East Tintic district.

Production of uranium ore was considerably higher in 1957. During the

**Utah Production of Iron Ore, Gold, Silver, Copper, Lead, Zinc and Dollar Value of Base and Precious Metals from 1941 Through 1957**

Year	Iron Ore Long Tons	Gold Ounces	Silver Ounces	Copper Tons	Lead Tons	Zinc Tons	Dollar Value
1941	397,607	356,501	11,395,485	266,838	69,601	42,049	\$ 97,796,623
1942	359,558	391,544	10,574,955	306,691	71,930	45,543	113,552,848
1943	922,559	301,470	9,472,340	313,989	61,257	46,896	124,562,410
1944	1,542,284	344,223	7,593,075	283,575	52,319	38,994	111,403,247
1945	1,931,249	279,719	6,106,545	224,376	40,217	33,630	90,106,641
1946	1,317,176	178,533	6,116,483	114,284	30,711	28,292	60,202,326
1947	2,823,853	421,162	7,780,032	266,533	49,698	43,673	158,624,849
1948	3,233,413	368,422	8,045,329	227,007	55,950	41,490	149,763,677
1949	2,712,390	314,058	6,724,880	197,245	51,072	40,670	121,649,828
1950	3,139,926	457,551	7,083,808	278,630	44,753	31,678	159,415,431
1951	4,726,159	432,216	7,310,665	211,086	50,451	34,317	182,897,139
1952	4,060,003	435,507	7,194,103	282,894	50,210	32,947	185,780,497
1953	4,617,288	483,430	6,725,807	269,496	41,522	29,184	195,289,033
1954	3,040,646	403,401	6,179,243	211,835	44,972	34,031	164,367,236
1955	3,847,402	441,205	6,250,565	232,949	50,452	43,556	220,628,713
1956	4,001,734	616,031	6,572,041	250,604	49,555	42,374	260,693,260
1957 <sup>1</sup>	4,151,000	376,900	6,190,400	233,800	44,200	40,200	181,049,700

1. Estimated by U. S. Bureau of Mines

year, Uranium Reduction Company dedicated its new 1,500 ton, acid-leach, RIP plant, though actual operation of the mill started in November 1956. Texas Zinc Minerals Company began operation of Utah's first solvent extraction uranium mill at Mexican Hat in November 1957. Rated at 750 tons per day, the Mexican Hat mill features a flotation circuit to recover important quantities of by-product sulphides occurring in the ore. Phase disengagement in the solvent extraction circuit at Texas Zinc is carried out in a unique centrifugal contactor. Vitro Uranium Company finished converting the Salt Lake City mill to solvent extraction during the year.

Mining of solid fuels attracted a great deal of attention during the year. American Gilsonite Company officially dedicated a mine at Bonanza, Utah, and a refinery at Gilsonite, Colorado, in August 1957. Gilsonite, a brittle, solid, hydrocarbon, which is highly explosive when finely divided, is stoped at the Bonanza underground mine with high pressure water-jets. The slurry drains to the shaft where it is pumped to the surface. On reaching the surface the pulp is pumped 72 miles through a 6-inch pipeline to the refinery where thermal cracking produces gasoline and metallurgical coke.

Iron ore shipments in 1957 advanced 4 percent over the 1956 total. Major producers were Columbia Iron Mining Company, subsidiary of United States Steel, from the Desert Mound and Iron Mountain mines; and Colorado Fuel & Iron Corporation. Utah Construction Company also produced important quantities of iron ore from Utah mines.

Calera Mining Company completed conversion of the Garfield cobalt refinery from hydrogen reduction to electro-winning. The new process produces higher

grade cobalt at less cost. Capacity of the plant is 8,000 pounds of cobalt daily.

San Francisco Chemical Company leased the Humphreys phosphate deposit, 15 miles north of Vernal, and with affiliate Stauffer Chemical Company, will move into the elemental phosphorous field. Mining and beneficiation, to be geared to elemental phosphorous production, will be handled by San Francisco Chemical. Stauffer Chemical will build the electric furnace plant. The Humphreys deposit is said to be low grade, averaging about 21 percent P<sub>2</sub>O<sub>5</sub>. Underground phosphate operations were carried on by San Francisco Chemical in the Crawford Mountains at the Arikaree and Cherokee mines.

## Washington

### • Lead Mined at Record Pace During 1957; Dawn Uranium Mill Reaches Full Capacity

The Northwest's first uranium processing plant began operations in August at Ford, about 45 miles northwest of Spokane in Stevens county. But the state's only large copper mine and its largest zinc-lead mine were closed during the year and metal mining generally was at low ebb because of low metal prices. Mineral production was valued at \$57,200,000, down \$4,400,000 from 1956. Lead output set a new record in 1957.

The uranium plant, operated by Dawn Mining Company, treated about 440 tons of ore daily although its rated capacity was 400 tons. Most of the ore came from the firm's Midnite mine in the adjacent Spokane Indian Reservation, where Isbell Construction Company mined from several open pits under contract. Midnite

reserves are reportedly sufficient for 5 years of mill operation.

Daybreak Uranium, Inc., started trucking ore to the Ford mill in September from its Mount Spokane (northern Spokane County) open-pit operation and by year's end had shipped 5600 tons valued at more than \$100,000. North Star Uranium, Inc., made an initial 500-ton shipment from the Mount Spokane district late in the year.

Uranium exploration was at a slower pace than in the two previous years and was centered in and around the Spokane Indian Reservation. Northwest Uranium Mines resumed downhole drilling in an attempt to add to proven ore reserves. Western Uranium Mines, Inc., drilled encouraging mineralization adjoining the Midnite mine. So did Spokane National Mines, which was formed late in the year by Wyoming interests to take over Dahl Uranium Mines, Big Smoke Uranium, Inc., and others. Geo-Resource Corporation found indications of a buried uranium deposit by soil sampling and started downhole drilling with aid of a Defense Minerals Exploration Administration loan.

Washington's largest underground zinc-lead mining operation, that of Pend Oreille Mines and Metals Company in Pend Oreille County, continued on a six-day week until the end of the year and then cut to a five-day week. Both the Pend Oreille mine and American Zinc, Lead and Smelting Company's nearby Grandview mine stepped up their lead outputs with the result that the state's lead production hit a new high. Direct-shipping grade lead ore was shipped from the Gladstone mine, Stevens County, by A. G. Lotze, lessee, and he started a new shaft on the boundary line of the adjoining old Electric Point mine, which he also has under lease. Utahcan, Inc., uncovered a number of lead-zinc-silver veins by surface bulldozing in Pend Oreille County's Jim Creek area and began construction of a mill.

Knob Hill Mines, Inc., at Republic, Ferry County, continued as the state's leading gold and silver producer and made a rich strike at depth in the adjoining leased Gold Dollar property owned by Day Mines, Inc., of Wallace, Idaho. Lovitt Mining Company, Wenatchee, Chelan County, again ranked second in gold production.

Output of magnesite by Northwest Magnesite Company, the largest producer of crude magnesite in the United States, was estimated to be slightly higher than in 1956.

## Wyoming

### • Big Increase in Uranium Ore Reserves; Iron Ore Project Still Speculated

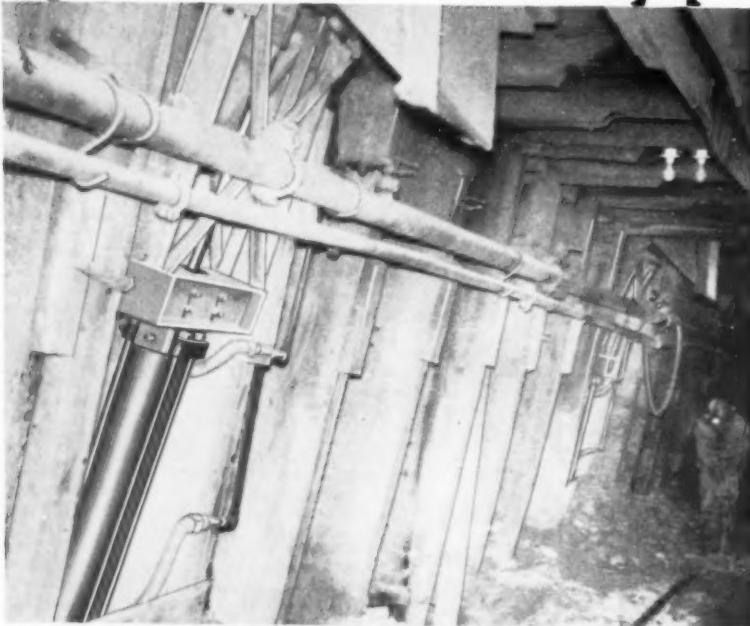
1957 was marked by the completion and dedication of Wyoming's first uranium mill, the 450-ton-per-day plant of Western Nuclear Corporation at Jeffrey City in the Crook's Gap area of Fremont county. Also, construction was initiated in March on Lucky Mc Uranium Corporation's 750-ton mill in the Central Gas Hills, and in December the AEC granted permission to Fremont Minerals, Incorporated, a subsidiary of Susquehanna Corporation, to construct and operate a mill at Riverton with a 500-ton capacity.

**Washington Production of Tungsten, Gold, Silver, Copper, Lead, and Zinc. Dollar Value of Base and Precious Metals from 1941 Through 1957**

Year	Tungsten <sup>a</sup> Tons	Gold Ounces	Silver Ounces	Copper Tons	Lead Tons	Zinc Tons	Dollar Value
1941	68	84,176	402,030	8,686	3,903	13,320	\$ 7,874,886
1942	45	75,396	369,038	8,030	4,851	14,398	8,172,609
1943	4	65,244	370,440	7,365	5,022	12,203	7,838,012
1944	5	47,277	321,608	6,164	5,825	11,904	7,195,136
1945	2	57,860	281,444	5,281	3,802	11,693	7,140,242
1946	1	51,168	264,453	4,527	2,987	11,329	6,886,748
1947	—	34,965	293,736	2,240	5,359	13,800	7,313,398
1948	—	70,075	375,831	5,665	7,147	12,638	11,171,715
1949	—	71,994	357,853	5,275	6,417	10,740	9,613,307
1950	—	62,117	363,566	5,057	10,344	14,807	12,652,302
1951	9	67,405	344,948	4,089	8,002	18,189	14,030,884
1952	4	54,776	315,645	4,357	11,744	20,102	14,767,054
1953	5	62,560	321,000	3,740	11,064	32,786	15,067,000
1954	18	66,740	313,735	3,636	9,938	22,304	12,305,762
1955	12	74,360	436,348	3,958	10,340	29,536	16,297,361
1956	NA	70,669	448,442	2,926	11,657	25,609	16,043,542
1957 <sup>1</sup>	NA	NA	NA	1,660	12,342	23,139	NA

1. Estimated by U. S. Bureau of Mines. \*Tungsten (recoverable content of ores) 60% WO<sub>3</sub>. NA—Not available

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### Please Turn To

Page 224 for charts showing U. S. mine production of key metals from 1900 to 1958.

Page 221 to check Minnesota, Michigan, and Wisconsin mine shipments of iron ore.

Page 222 for listing of tonnages mined at important U. S. open pit mines.

Page 223 to see the rank of the major underground U. S. mines.

Even before construction was completed on Western Nuclear's mill, the company had petitioned the AEC for an increase in capacity to 1,200 tons per day. The plant is reportedly treating over 650 tons-per-day at the present time. When construction was only 3 months along, Lucky Mc presented a proposal, jointly with Phelps Dodge Corporation which had proved vast reserves on Wyoming. Uranium Corporation claims in the Crook's Gap district, for an increase in mill capacity to 1,750 tons.

Continued uranium exploration and development, boosted Wyoming ore reserves substantially. Official AEC calculations in June 1957 put Wyoming uranium ore reserves at 5,600,000 tons. At years end, proven uranium ore reserves were estimated at nearly 18,000,000 tons. Vitro Minerals Corporation continued as the largest producer in the Gas Hills area, with a total production of 150,000 tons of ore mined as of the first of December 1957. Large stripping operations were underway at several locations in the Gas Hills. Among the largest were two pits opened by Lucky Mc—one 1,100 feet by 400 feet and a second pit further south 1,700 feet by 600 feet. Western Nuclear also continued development of an open pit on the Bullrush ore body in the Gas Hills district.

Columbia-Geneva Division of United States Steel Company continued extensive drilling and development of the large, low-grade magnetite ore properties at Atlantic City. Centennial Development Company did the exploratory work under a contract signed with Columbia-Geneva. There were increasing signs that Columbia-Geneva definitely would proceed with mining the ore and construction of a beneficiation plant, but no official announcement was made. A \$16,000,000 magnetic separation plant is reportedly contemplated for the Atlantic City project.

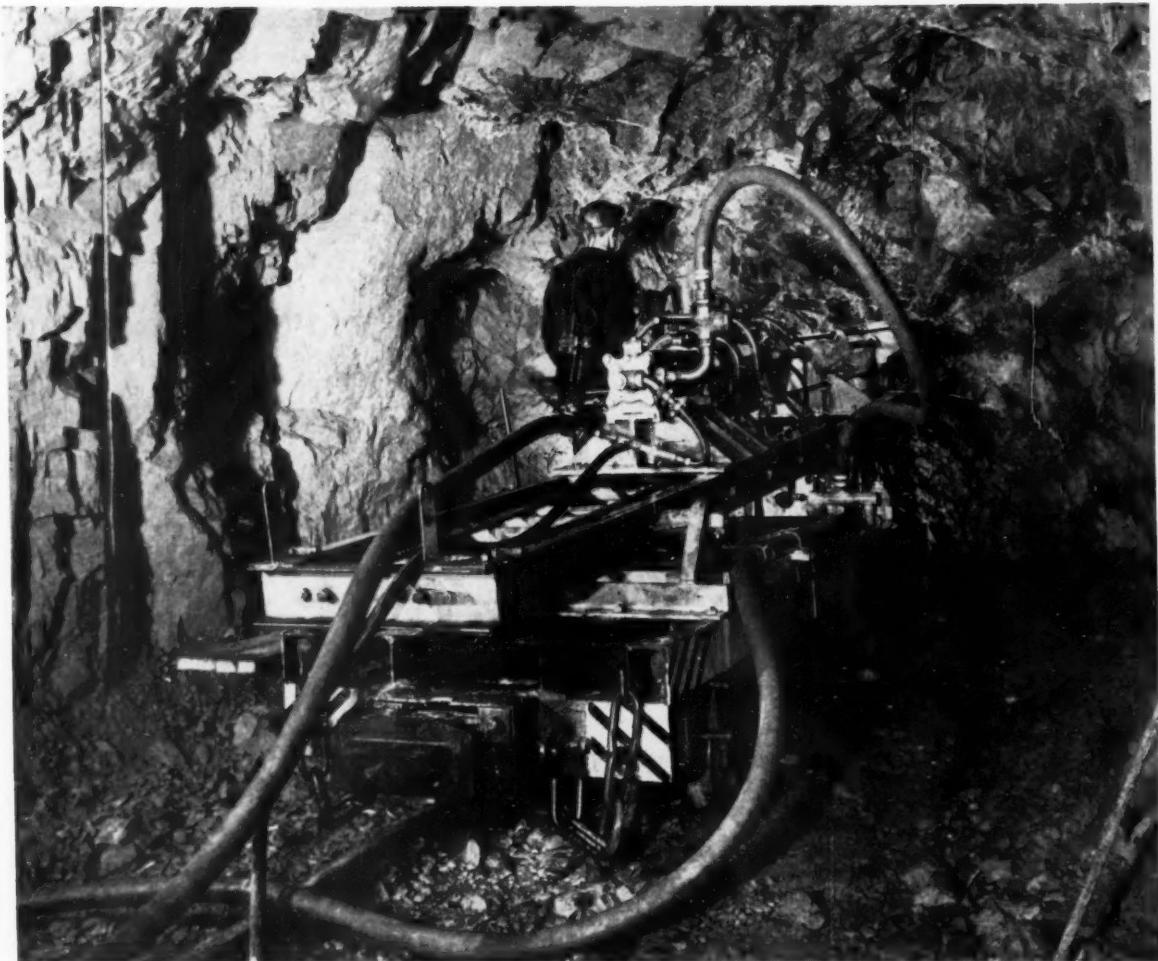
Columbia-Geneva has repeatedly declined to make a public statement.

Iron ore output in Wyoming was up, due largely to an increase in production from the Sunrise mine of Colorado Fuel & Iron Corporation and continued production of iron ore (aggregate) by Magnetite Products Company. During 1957, Colorado Fuel & Iron launched a 2-year project to lower the shaft at the Sunrise mine by 160 feet.

Intermountain Chemical Company's soda ash plant at Westvaco near Green River reportedly will be expanded from 350,000 to 400,000 tons annually. Completion of a third shaft at the property in 1956, was the reason given for expanded capacity.

San Francisco Chemical Company completed a flotation plant at Leefe, near the Idaho border, for up-grading phosphate ore, according to reports.

# A PICTURE OF World-wide Mining



## CARIBBEAN

### BRITISH VIRGIN ISLANDS

The British Virgin Islands, forming a geographic and economic unit with the Virgin Islands of the United States, are a Crown Colony composed of Tortola, Anegada, Virgin Gorda, and 25 other islands. The mineral industry continues to be limited to sand, salt, and a little stone for aggregate.

The copper-molybdenum mine at Copper Mine Point, Virgin Gorda, that was worked during the early and middle 19th Century, has been extensively explored by the Jamaican mining company that holds the mineral concession on the area. General geologic mapping of western

Virgin Gorda and detailed geologic mapping of the mine area were carried out and a diamond drill program was under way at the end of 1957, but it is still too early for definite conclusions to be drawn from this work.

### CUBA

Cuba's mining industry continued during 1957 the rate of expansion which within a few years has brought it into fourth place as a source of the nation's income.

Cuba today rates as the second largest producer of nickel (after Canada) in the free world, with an output of approximately 15 percent of the world supply. But Cuba production will increase even

more within a few years. The Freeport Sulphur Co. this year launched a \$75,000,000 project to work concessions it holds at Moa Bay, on Cuba's northeast coast. (Freeport also owns the concession at Nicaro, but leases it to the U. S. Government.)

Production is scheduled to begin at Moa in the summer of 1959. The Cuban-American Nickel Company, a Freeport subsidiary, signed an agreement with the U. S. Government under which the latter agreed to purchase the firm's future output from Moa until June 30, 1965 (up to 271,000,000 pounds of nickel and 23,835,000 pounds of cobalt). Purchases will be at prices equivalent to those of March of 1957.

The Cuban government helped the Moa project by granting extensive tax

## Caribbean

exemptions to Cuban-American.

The U. S. Government, with the largest investment in Cuban mining, announced plans to sell its investment to private industry. At a cost of \$37,000,000, in March 1957, the Government completed an expansion program at the nickel facilities it controls at Nicaro. In previous years the Government had already invested some \$60,000,000 in Nicaro.

The rated capacity of the plant was upped to 50,000,000 pounds of nickel annually. Even before the expansion program was completed, production in 1956 reached a record output of 32,123,000 (as against 30,275,000 pounds the previous year).

The quantity of copper, chrome, and nickel exports moved upward during the first half of 1957, as compared with the same period of 1956. Iron and manganese exports were trending downward. The biggest jump was in chrome exports, which amounted to 947,531 tons (value: \$64,594) during the first five months of this year, as compared to 219,725 tons (\$15,522) during the same period of 1956.

## Dominican Republic

The Dominican Republic exported minerals valued at \$2,000,000 in 1957, compared with \$1,500,000 in 1956. Iron exports total 192,000 tons of ore in 1957, compared with 144,000 tons in 1956. The country's principal minerals resources are iron, bauxite, and nickel. Plenty of salt is found; and for construction there are large deposits of gypsum, marble, granite rock, etc.

Beneficiadora Falconbridge of Canada has already blocked out about 50,000,000 tons of nickel ore, and expects to finish plant installations for start of production by 1961.

Aluminum Company of America has blocked out about 40,000,000 tons of bauxite ore and expects to go into production about October 1958. Their plans are to produce 500,000 tons of aluminum in the first year, and then to increase gradually to 900,000 tons annually.

A new foreign mining company, Hatillo, has been doing exploration work for nickel.

The government has passed a new mining code which is favorable to foreign investment.

## Haiti

First shipments of bauxite ever made to the United States from Haiti were initiated on April 25, 1957 by Reynolds Haitian Mines Inc., wholly owned subsidiary of Reynolds Metals Company. One of the Reynolds fleet of self-unloading ore carriers, the "S.S. Carl Schmedemann," made the first shipment, with subsequent ones continuing through the year on that vessel and the "S.S. Louise."

Reynolds mines its ore by Marion 111-M Diesel shovels at an elevation of about 3,000 feet above sea level. The ore is transported in Dart trucks, over an eight-mile paved mountain road, to the drying plant near the shore. The drying plant consists of two Hardinge-Ruggles Coles rotary dryers, concurrently fired by means of bunker "C" oil in Dutch Oven type combustion chambers.

Dry ore is stored in a large aluminum covered shed; from here it is moved by

conveyor to the ships for loading. Almon Johnson constant tension winches load the various holds. Electric power requirements for the entire operation are supplied by three Cooper-Bessemer Diesel engines directly connected to Westinghouse generators.

Sedren S. A., the wholly owned Haitian subsidiary of Consolidated Halliwell Limited (Canada), has been actively engaged since the latter part of 1955 in the exploration and development of copper occurrences discovered on its concession of approximately 100 square miles located in the Terre Nueve district about 15 miles north of the port city of Gonaives.

Aerial photography and airborne magnetometer survey of the entire concession were completed in 1956. Following this a major portion was covered by ground magnetometer (including some self-potential) and geochemical soil sampling. Geophysical surveys were completed early in 1957. By mid-1957 prospecting crews had covered practically the entire concession area. Geological reconnaissance mapping was accomplished around the more promising exposures, particularly at the Meme, Casseus, and Bresillac zones.

## Jamaica

Both bauxite and alumina production showed further increases in 1957. Bauxite exports by the two United States companies, Reynolds Jamaica Mines Ltd. and Kaiser Bauxite Company, amounted to 4,239,972 long tons of kiln-dried ore with an approximate moisture content of 14 percent, corresponding to 3,641,253 tons of absolutely dry bauxite. The alumina production was doubled and 435,752 tons of alumina were exported by Alumina Jamaica Limited in 1957 as compared with 213,321 tons in 1956. As can be seen from these figures the island has become the leading bauxite producer of the Free World, surpassing the two countries that have been the major producers, namely, British Guiana and Surinam.

Alumina Jamaica Ltd. doubled the capacity of its Kirkvine Works near Mandeville with a new addition, which came into operation in March. The Company also was engaged in the construction of a new alumina plant at Pleasant Farm near Ewarton, scheduled to be completed by the middle of 1958, with an initial capacity of about 220,000 tons. Reynolds Jamaica Mines Ltd. completed the expansion program for doubling its production, and the north-coast project of the Kaiser Bauxite Company was in its initial stages.

Two other companies, American Metal Climax, Inc. and Harvey Aluminum Company, have been granted Special Exclusive Prospecting Licenses for further prospecting for bauxite on the island and this work is now in progress. In March 1957, a new agreement was entered into between the Government of Jamaica and the three operating companies amending the original 25-year bauxite agreement and altering the existing royalty and tax rates. Under the terms of this new agreement, for a period of 25 years, the island will obtain 11s. per ton income tax plus 3s. per ton royalty, making a total of 14s. per ton. Income tax and royalties are subject to variation accord-

ing to the changes in the world price of aluminum.

Gypsum mining, carried out by Jamaica Gypsum Limited, a local subsidiary of U. S. Gypsum Company, also made further progress; the total gypsum production of the year amounted to 189,161 tons compared with 124,876 tons in 1956. Of this amount 178,986 tons of crushed gypsum rock were exported to the United States of America, the remainder being sold locally to the cement company and others.

Prospecting for iron and base metals was continued during the year in several areas, particularly in the Bellas Gate and Mavis Bank districts. New management of the Mavis Bank Iron Co. has resumed prospecting operations at Mavis Bank where, in addition to iron, copper and cobalt mineralization have been encountered.

## PUERTO RICO

As in previous years the industrial minerals form the bulk of the mineral production of Puerto Rico, but prospecting for metals continued to expand during 1957. During 1956 the total mineral production was \$16,395,000, a record production for the second consecutive year and nearly \$1,500,000 higher than the record production of 1955. The 1957 mineral production was about \$20,000,000, based on preliminary estimates, an increase of approximately 22 percent.

During 1957 approximately \$200,000 was spent by private interests in exploring for iron, copper, lead, manganese, and other minerals. In addition, some \$140,000 was expended by the Commonwealth and Federal Governments for geological research. One of the most significant of the cooperative projects was the detailed drilling and sampling of a nickel-cobalt-chromite-bearing laterite near Mayagüez, in which 10,500 feet of hole were drilled and sampled by the U. S. Bureau of Mines. Another was the detailed geologic mapping of Central Puerto Rico, by the United States Geological Survey, which will lead to a complete geologic map of the Island by about 1963.

## VIRGIN ISLANDS OF THE UNITED STATES

The United States Virgin Islands are composed of the three major islands of St. Thomas, St. Croix, and St. John, and a large number of smaller islets, rocks, and reefs. Crushed rock continues to be the only commercial mineral production, largely from basalt quarries operated by the Territorial government and others on St. Croix.

A program to completely map the Islands is progressing rapidly with topographic quadrangles already published of St. Thomas and nearly completed for St. John and St. Croix. Geologic mapping of St. Thomas and St. John was completed during 1957 by Princeton University. Upon final publication of this work the interpretation of the hydrothermal alteration zones and their relation to the copper prospects may become possible.

# CANADA

Once again the Canadian mining industry set a new record for mineral production, with 1957 output valued at \$1,578,440,907, three percent more than in 1956. Canada continued as the world's largest producer of nickel and asbestos; second largest producer of aluminum, gold, cobalt, platinum, and zinc; and is in third place as a uranium producer. Although the value of lead, zinc, and copper decreased, expanded output of uranium and nickel more than balanced the loss. And in nearly every branch of mining, expansion and development programs continued.

## British Columbia

Unfavorable Provincial legislation, coupled with worldwide problems of low metal prices and high production costs, sharply curtailed prospecting and exploration activity in British Columbia during 1957. With passage of the Mineral Act Amendment, which changes the system from Crown grants to leases, the number of claims staked in 1957 dropped 56 percent from 1956 figures.

Consolidated Mining & Smelting Company of Canada Ltd. again led production of lead and zinc, even though open-pit mining was suspended at its Sullivan mine, as were its Tulsequah operations. The nickel-copper deposit under development by Western Nickel Mines was ready to begin production at the close of the year.

## Manitoba

Hudson Bay Mining & Smelting Company began production from its Birch Lake mine late in 1957, with daily production of 400 tons. Development of the company's properties in the Snow Lake area progressed on schedule, with the Chisel Lake shaft reaching the 2,000-foot level and the Stall Lake shaft sunk to more than half that depth.

Important progress was made at International Nickel Company's Mystery-Moak Lake development, where excavations were completed and building and equipment foundations well advanced. Rio Canadian Exploration, Ltd. acquired options on 668 claims in the same area.

Gunnar Mines and Strategic Materials Corporation of New York made news during 1957 with the establishment of Stranar Mines to develop large chromite properties in the Cat Lake-Bird River area.

## New Brunswick

Heath Steele Mines became the province's first lead, zinc, and copper producer during 1957, while several other companies continued development and exploration. Three new base metal deposits were discovered: Anaconda Company of Canada reported two in the Armstrong Brook and Rocky Turn area, and other was reported by Captain Mines Ltd. near the Brunswick No. 6 ore body.

## Northwest Territories

Gold and uranium were of major importance in mineral development during 1957. Rayrock Mines Ltd.'s uranium mine and mill began production, and in the region of the East Arm of Great Slave

Lake, uranium indications caused a rush to file claims.

Large lead-zinc deposits were reported on the shore of Great Slave Lake, and similar deposits were discovered at Indian Mountain Lake. In the Coppermine area, geophysical and geological work has been underway by several companies, involving 30,000 feet of diamond drilling during the past year.

## Ontario

Although mining activity has leveled off to a more normal routine, the Blind River district continued to be in the spotlight during 1957. By the end of the year, five companies (Northspan, Consolidated Denison, Can-Met, Algoma, and Pronto) had begun production from six of the 11 mines in the district, and three others are expected to begin operations during 1958. At this time, total reserves of the area are reported at 250,000,000 tons of ore, valued at \$3,000,000,000.

In the Bancroft area, three companies, operating two mills, are now in production and a fourth is expected to begin production during the first half of 1958.

Nickel production reached a new high, and International Nickel Company of Canada Ltd. and Falconbridge Nickel Mines Ltd. continued expansion and further development of deposits in the Sudbury Basin.

## Quebec

A new record for asbestos production was set in 1957 in the Eastern Townships, with slightly more than 1,000,000 tons produced. Because of the growing market and the large reserves, asbestos producers continued to expand operations and Carey-Canadian Mines, National Asbestos Mines, and American Smelting and Re-

fining Company's subsidiary, Lake Asbestos of Quebec, will begin production within the year.

Iron production also increased during 1957, and further development is planned by the newly established Ungave Iron Ore Company and the Quebec Cartier Mining Company.

## Saskatchewan

Potash deposits were the center of mining activity during 1957. Potash Company of America's shaft reached the 2,500-foot level, with less than 1,000 feet remaining to complete the project. Installation of a recovery plant neared completion and the plant is expected to begin operations by the end of 1958. International Minerals & Chemical Corporation continued its program of shaft sinking and began construction of a recovery plant. Columbia Metals Exploration Company, Ltd. entered the potash field with exploratory drilling near Atwater.

Uranium was also in the limelight with Eldorado Mining and Refining Company and Gunnar Mines leading in production. Lorado Uranium Mines' custom mill was completed and began treating ores from several small, high-grade mines in the area.

## Yukon

Cassair Asbestos Corporation Ltd. reported substantial asbestos findings on its Caley, Clinton Creek, and Letain properties, leased from Conwest Exploration Ltd. Continued exploration and development slightly increased ore reserves of United Keno Hill Mines Ltd. in the Mayo district, and several other companies have undertaken exploration in neighboring areas.

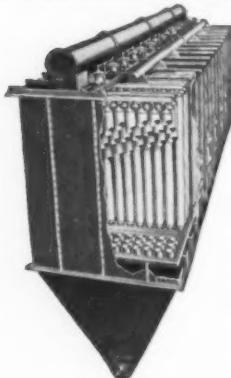
**Metal Production and Values in Canada as Tabulated by the Dominion Bureau of Statistics For 1955, 1956, and 1957**

Metal	Quantity	Value	1956		1957 <sup>1</sup>	
			Quantity	Value	Quantity	Value
Antimony <sup>2</sup>	2,021,726	\$ 563,345	1,820,000	\$ 576,300	1,411,000	\$ 353,697
Asbestos <sup>4</sup>					1,061,419	106,395,200
Barite <sup>4</sup>					216,325	2,461,538
Bismuth <sup>2</sup>	265,896	572,362	273,007	494,157	276,791	536,599
Cadmium <sup>2</sup>	1,191,081	3,262,439	2,258,184	3,838,913	2,340,015	3,978,025
Cobalt <sup>2</sup>	3,318,637	8,563,700	3,685,956	9,372,670	3,736,175	8,081,226
Copper <sup>2</sup>	651,987,423	239,756,455	706,585,547	291,469,615	692,053,656	199,543,377
Fluorspar <sup>4</sup>					68,463	1,798,308
Gold <sup>3</sup>	4,541,962	156,789,528	4,378,862	150,808,010	4,436,101	148,786,827
Indium <sup>2</sup>	104,774	232,598	358,000	805,500	385,000	847,000
Iron Ore <sup>4</sup>	16,283,177	110,435,850	22,526,311	156,327,885	22,386,993	155,549,111
Iron Ingots <sup>4</sup>	115,955	4,831,845	157,000	6,339,000	186,700	6,148,000
Lead <sup>2</sup>	405,525,038	58,314,500	373,349,551	57,906,514	375,819,451	52,464,395
Magnesium and Calcium <sup>2</sup>		6,585,409		5,617,826	16,259,808	5,353,245
Molybdenum <sup>2</sup>	1,389,177	823,954	1,452,028	967,461	874,600	1,145,726
Nickel <sup>2</sup>	349,856,992	215,866,007	355,986,460	223,343,992	376,265,731	261,253,209
Palladium, iridium, Rhodium, Ruthenium, etc. <sup>2</sup>	214,252	8,321,633	161,600	6,495,065	213,285	7,726,930
Platinum <sup>2</sup>	170,494	14,747,732	150,000	15,585,000	196,077	17,490,000
Selenium <sup>2</sup>	427,109	3,203,519	508,000	8,858,000	352,871	3,763,500
Silvers <sup>2</sup>	27,984,204	24,676,472	28,794,573	25,831,612	30,138,447	26,319,907
Tellurium <sup>2</sup>	9,014	15,774	24,000	42,000	34,503	63,981
Tin <sup>2</sup>	492,781	408,030	611,000	521,550	809,000	764,505
Titanium <sup>2</sup>	1,164	10,634	4,443	37,100	10,485	54,638
Tungsten Concentrates (WO <sub>3</sub> ) <sup>2</sup>	1,942,770	5,508,437	2,206,662	6,060,992	1,992,840	5,579,952
Uranium <sup>2</sup>		26,031,604		39,577,000	12,875,799	130,911,234
Zinc <sup>2</sup>	866,714,038	118,306,466	847,239,825	125,476,218	824,617,875	99,696,301
Total Value		\$1,007,827,093		\$1,136,552,380		\$1,247,066,431

1. Preliminary estimate 2. Pounds 3. Ounces 4. Tons

## THE NORTHERN BLOWER COMPANY

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**PRODUCTS:** Automatic and Semi-Automatic Bag Type, H. E. L. S. Cyclone or Centrifugal Type, Hydraulic Type Dust and Fume Collectors, Cement Air Cooling System, Self-Contained or Portable Bag Type Units, Exhaust Fans . . . All designed and fabricated by our own shops.

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For continuous or heavy duty service providing very high efficiency at very low cost of operation and maintenance. Basic unit contains 78 bags, 6" diameter, 8' 3" long. Air flow is upward, from inside, thus keeping bags fully distended. Total free cloth area per compartment 936 square feet. Shaking and cleaning controlled by electric timer, is cyclic, one compartment at a time, each having its individual compressed air shaker mechanism and the whole system variable and adjustable for dust load without shutting down. Mechanical (electric motor) operation available. Any compartment can be cut out without affecting others. Access to interior is on the clean air side.

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A high efficiency, wet type collector, for separation of dust mixed with smoke or fumes. In most installations the Hydraulic unit is used with a Norblo Cyclone collector, thus reducing the amount of wet sludge to be handled. There are no moving parts. Filter beds are coke or high-fired ceramic tubes, light in weight and kept in motion by ascending air stream so that beds are self-cleaning. Built in 11 standard sizes with capacities up to 26,000 cfm.

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A cyclone or centrifugal type collector for all materials, from saw-dust to fly ash; characterized by high efficiency of collection with low static drop. The Norblo H. E. L. S. has no internal vanes, gadgets or dampers. High efficiency is obtained by scientific proportioning and by the patented (No. 2,259,919) expanding nozzle. These design features eliminate the power-wasting back eddy. Built in standard sizes with capacity up to 37,500 cfm.



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Self-contained units for efficient, de-centralized dust collection. Convenient, space-saving; can be located close to the dust source. Made in six sizes in bag type, with capacities from 300 to 1350 cfm. All models have 8" static at fan. Fans exceptionally quiet.

### Norblo Exhaust Fans

These high speed, low power fans have been developed especially for dust collecting systems and by proper wheel selection are adaptable to all types of materials handling. All wheels are statically and dynamically balanced. Heavy duty bearings are standard equipment.



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- Reduction of 50% in truck hours required for sprinkling.
- Single application effective 3 weeks without re-sprinkling.

ORZAN AL-50 has proved itself for years as an efficient, low-cost binder for soil particles. It is available as a 50% solution in tank cars or in 50-gallon drums — also as a powder (ORZAN A) packed in 50-pound bags.

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# OCEANIA

## AUSTRALIA

Production of most metals increased slightly in 1957. Expanded output of rutile and zircon was very marked compared with the previous record figures established in 1956. Due to the year end collapse in spot prices for these minerals, 1957 production records will not be maintained in 1958, although capacity will be available to take advantage of any resurgence in demand.

The exuberance of the mining community following discoveries of enormous bauxite deposits over a year ago has been dampened by general declines in metal prices. 1957 ended darkly and 1958 began on an even more somber note with announcements from the great Broken Hill lead-zinc producers: first, that zinc concentrate shipments had been suspended and, later, that working time would be reduced by 10 percent.

### QUEENSLAND

The Cape York Peninsula bauxite deposits are now regarded by some authorities as the world's largest. A special act of the Queensland parliament has encouraged establishment of an aluminum industry while ensuring that large expenditures will be undertaken by Commonwealth Aluminum Corporation Pty. Ltd., a subsidiary of Consolidated Zinc Pty. Ltd. In addition to "comalco," Aluminum Laboratories Ltd., a subsidiary of the Aluminum Corporation of Canada, is prospecting bauxite areas on the Peninsula. Aluminum Laboratories Ltd., Reynolds Pacific Mines Pty. Ltd., and Rio Tinto Australia Exploration Pty. Ltd. are also prospecting for bauxite in the Northern Territory.

Mount Isa Mines Ltd. vigorously pursued its development and expansion programs. Large additions were made to both copper and lead-zinc ore reserves. Further large increases are expected during the 1958 year. Construction of the copper refinery at Townsville is well advanced and production is expected to commence in mid-1959. Plans for an increase in ore production from 4,000 to 13,000 tons per day are dependent upon rehabilitation of the Mount Isa-Townsville railway. This is under consideration by the Queensland and Federal governments. Meanwhile production is to be stepped up to 6,000 tons of ore per day in April 1958, increasing to 7,000 tons per day in December 1958.

Mount Morgan Ltd., copper and gold producer, expressed concern at the trend of copper prices and a reduction in pyrite sales. Stabilization of copper price and an improvement in demand for pyrite are both necessary to put the mine on a satisfactory basis.

Mary Kathleen uranium mine is expected to commence producing uranium oxide within a year. Construction recently has been ahead of schedule.

### NEW SOUTH WALES

Rutile and zircon producers on the north coast of this state and the south coast of Queensland produced record tonnages of minerals from beach and dune deposits. Most companies were forced to curtail production and several of the newcomers to this field of mining suspended operations by year's end, due to the virtual disappearance of the market for spot mineral sales.

## VICTORIA

Gold mining on a small scale continued, largely as a result of the Federal government subsidy. Some work was done on the investigation of iron deposits at Nawa Nawa but prospects of finding iron ore reserves appear brighter in several other states of the Commonwealth.

### TASMANIA

Deposits of iron ore in the west coast district, at Savage River, Rocky River, and Long Plains were explored. These are believed to be very large. A subsidiary company of Rio Tinto Ltd. was interested in possible development of the area.

The joint exploration program of The Mount Lyell Mining and Railway Co. Ltd. with The Electrolytic Zinc Co. of Australasia Ltd. continued in selected areas of the southwest coast.

King Island Scheelite Ltd., King Island, produced 1,437 tons of concentrates in its financial year ended October 1957. This was almost 100 tons below the record output of the previous year. The contract with the United States government expires in April 1958, after which concentrates must be sold on the open market. Working time has been reduced from seven days per week to five.

Refined zinc output by The Electrolytic Zinc Co. Ltd. was 105,000 tons. The company continues to obtain most of its concentrate from its own mines at Rosebery.

The Mount Lyell Mining and Railway Co. Ltd. had some success in its expansion program. Copper output was at a rate of 10,000 tons per year, all of which was sold on the local market. A new ore body was reported at Mount Lyell and its potential is being investigated. Drill hole results have been erratic, with some very high values.

### SOUTH AUSTRALIA

Late in 1957, The Broken Hill Proprietary Co. Ltd. reopened the Iron Baron hematite deposit, near Whyalla. This is a low-manganese ore body worked on a small scale from 1933 to 1941. The ore will augment supplies to the expanding blast furnace requirements at Port Kembla, N.S.W.

The State Mines Department intensified its prospecting and testing work on iron ore deposits in the Middleback Ranges.

Southwestern Mining Ltd., in which Nickel Mines of Australia and Southern Mining and Development Co. Ltd. have equal shares, continued geological and geophysical surveys and related work at Mount Davies.

The Broken Hill Associated Smelters Pty. Ltd. will install a blast furnace for zinc production similar to that reported by Consolidated Zinc Pty. Ltd. for installation at Cockle Creek, N.S.W. No date has been set down for commencement of the project which, presumably, may be delayed by the present depressed state of the zinc industry generally.

## WESTERN AUSTRALIA

Iron ore shipped from Cockatoo Island to two N.S.W. steelworks was at the rate of 430,000 tons per year (compared with 3,000,000 tons from Whyalla, S.A.). The Western Australian State Government twice applied to the Federal Government for a license to export iron ore to Japan. The proposal was disallowed by the Commonwealth on the grounds that iron ore reserves are inadequate.

Gold continues as Western Australia's major metal. 80 percent of Australia's gold comes from this state. The Commonwealth gold subsidy has, undoubtedly, been responsible for maintaining output at the current level and there does not appear to be prospects of any significant increase unless deep drilling for a repetition of Kalgoorlie's "Golden Mile" is successful. Exploration is continuing.

Regular shipments of ilmenite were made from the port of Bunbury to Australian and overseas consumers. There appears a grave danger of oversupply in the ilmenite market, as there is in the case of rutile. The intention of Westralian Oil Ltd. to produce 100,000 tons of ilmenite per year will only aggravate the situation.

Production of copper concentrates on a small scale commenced at Ravenshorpe.

## NORTHERN TERRITORY

Atlas Corporation of New York, New York, abandoned its interest in one of the glamour companies of the uranium boom—North Australian Uranium Corporation N.L. What remains of the Atlas interests has been purchased by Aberfoyle Tin N.L., of Tasmania. National Lead Company, also of New York, ceased all work on the leases of New Merlo Gold Mines N.L. at Tennant Creek and gave notice of termination of the agreement between the two companies. Northern Hercules N.L., Pine Creek, after further losses, sold its plant and leases to United Uranium N.L. United Uranium, the successful South Alligator River uranium producer, will convert the plant for production of uranium oxide. Although United Uranium's ore reserves are not yet large, the ore body is comparatively rich and should develop fa-

### Australian Mine Production of Metals From 1952 Through 1957

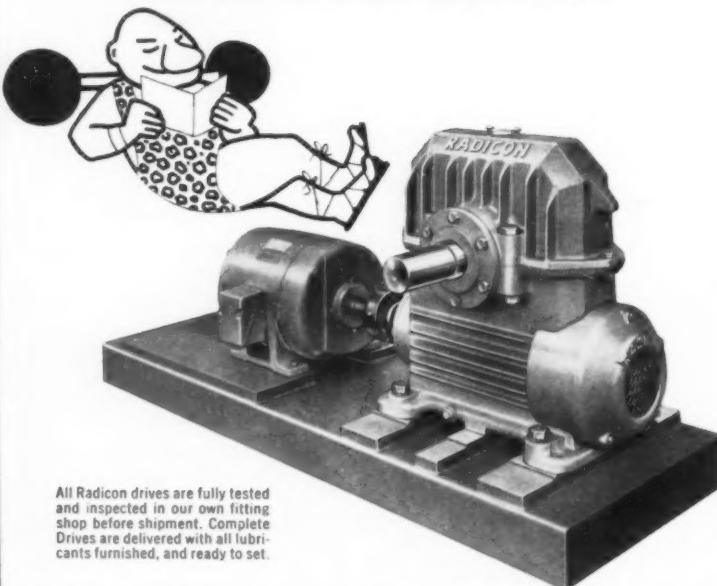
Metal	1952	1953	1954	1955	1956	1957 <sup>1</sup>
Gold <sup>2</sup>	980,400	1,075,200	1,117,742	1,049,039	1,029,821	1,078,000
Silver <sup>3</sup>	11,278,400	12,539,200	13,827,038	14,555,412	14,586,197	15,000,000
Copper <sup>4</sup>	18,578	36,585	41,256	46,165	53,706	56,000
Lead <sup>4</sup>	228,196	269,344	284,862	295,944	299,485	305,000
Zinc	196,450	239,324	252,659	256,564	278,082	290,000
Tungsten <sup>5</sup> , WO <sub>3</sub> Content	1,282	1,116	1,100	1,170	1,220	1,200
Tin <sup>6</sup>	1,611	1,553	2,075	2,017	2,078	2,100
Rutile concentrates <sup>7</sup>	38,861	38,039	44,659	59,613	96,327	130,000
Zircon concentrates <sup>7</sup>	N.A.	27,207	41,453	48,683	72,458	90,000
Iron ore <sup>8</sup>	N.A.	3,298,718	3,518,804	3,572,609	3,923,985	4,000,000
Sulphur <sup>9</sup> , *	N.A.	N.A.	N.A.	N.A.	N.A.	235,100

1. Estimated. 2. Fine ounces. 3. Long tons.

4. Recoverable sulphur content of zinc, lead, and pyrite concentrates.

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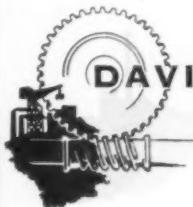
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## Oceania

vorably. Nearby, the property of South Alligator Uranium N.L. continues to open up satisfactorily.

In conjunction with King Island Scheelite N.L. and Loloma (Fiji) Gold Mines N.L., United Uranium is exploring the Maranboy tinfield. The field had been worked previously to shallow depths only. Intersections of ore so far made are most encouraging.

Peko Mines N.L., Tennant Creek copper-gold producer, completed an expansion program. It now has capacity to produce 9,000 tons of copper per year in concentrate form but will limit production to what can be disposed of on the Australian market pending an improvement in metal prices overseas. It appears that the mine will only work at about half capacity in the meantime.

## Fiji

During 1957 Fiji mining depended on the gold production from the Emperor Gold Mining Company Limited's group in the Vatukoula field and on manganese produced by syndicates from several small but relatively high-grade opencut deposits, chiefly from the Nadi-Sigatoka area of southwestern Viti Levu.

A revival of interest in several small copper deposits subsided with the fall in metal prices and no export production resulted, the small development output being stockpiled. One such deposit on Vanua Levu is reported to show signs of radio activity.

Aluminum Laboratories Ltd. commenced a search for commercial bauxite deposits at several points throughout the group but no finds have been announced.

In the Vatukoula goldfield the most significant feature was the evidence of a continuation of the deposits to the eastward, and development has proved the main flatmake system to be passing into the "mudstone" basin at depth. This basin was formerly believed to contain an unfavorable column of sedimentary pyroclastics, but drilling has shown it to consist largely of andesitic flows interlayered with relatively small amounts of ash and similar materials. This explains the gold and tellurides found by drilling and alters the prospects.

Development in progress on No. 15 level of the Emperor property is designed to open the favorable area disclosed by drilling but early in 1958 was suspended until heavy bulkheads and pumps have been installed against the high pressure water known to exist in the undrained "basin."

The Fijian Colonial Government has agreed to waive taxation and royalty payments by the Emperor group in return for the heavy expenditure being made on the search by the group.

### Gold Ore Mined and Milled in Long Tons, Ounces of Gold and Silver Recovered, and Long Tons of Manganese Mined in Fiji in 1956 and 1957

Item	1956	1957
Gold-Silver		
Mined, tons	164,819	181,334
Milled, tons	165,987	208,507
Gold, fine ounces	67,282	78,807
Silver, fine ounces	24,080	25,278
Manganese		
High-grade, 48-60% Mn	18,262	20,698
Low-grade, 35-48%	0	6,766

## Oceania

### INDONESIA

Tin production in Indonesia declined for the fourth straight year to 27,725 long tons. In 1956 it was 30,053, in 1955 33,368, and an all time high of 35,861 in 1954. Once again production from Banka (17,292) was greater than the combined output from Billiton and Singkep (10,431).

Value of tin exports in 1957, according to the preliminary data from the Central Office of Statistics, was Rupees 619,000,000, compared with Rupees 707,000,000 in 1956 and Rupees 678,000,000 in 1955.

The Tambang Mas Tjikotok gold operations in southern Banten, West Java, went into production on a trial basis in August. Until the middle of December about 40 kilograms of gold had been produced from the Tjirrotan mine. The Tjikotok mine did not get underway during the year. The government bought 25 percent of the production at the official price of gold, Rupees 12,465 per kilogram. The other 75 percent was sold on the free market for at least Rupees 60,000 per kilogram. About 1,000 kilograms of silver were also mined which sold on the free market for Rupees 720 per kilogram. Both mines should be operating in 1958.

The Bank Industri Negara bought out the only gold-silver smelter and refiner in Indonesia, N. V. Essaer & Affilagedbedrijf v/h Braakensiek in Djakarta, from the British owned, A. Gutwirth. This plant processes the Tjikotok output.

The government-owned asphalt mine at Buton, being developed by the Buton Asphalt Company, was producing at a rate of about 40 tons per day during the year.

Discoveries of manganese and iron ore were both reported in West Java.

#### Indonesia Tin Production in Long Tons by Months and Sources in 1957

Month	Banka	Billiton and Singkep	Total
Jan.	1,104	884	1,988
Feb.	952	840	1,792
Mar.	1,205	822	2,027
Apr.	1,195	677	1,872
May	1,368	711	2,079
June	1,566	745	2,311
July	1,666	739	2,405
Aug.	1,726	852	2,578
Sept.	1,846	1,040	2,888
Oct.	1,808	1,211	3,019
Nov.	1,570	1,062	2,632
Dec.	1,286	848	2,134
Jan.- Dec.	17,292	10,431	27,725

### NEW CALEDONIA

The nickel companies have expanded production to meet greater demands. The ore target was 1,800,000 annual metric tons and was not reached. It will be lower in 1958 than in 1956. Exports to Japan increased to 1,100,000 tons from 770,000 in 1956. Exports for 1958 will be about 500,000 tons.

The electric furnace plant at Yaté is expanding to 20,000 annual tons (matte plus ferronickel) in 1960. In 1957 output was 10,300, up from 9,600 in 1956. 12,000 to 13,000 tons are planned for 1958.

Chromite production increased to 63,000 tons from 49,000 in 1956. Output of 60,000 is to be maintained in 1958.

### NEW GUINEA

Gold dredging and sluicing are the most important mineral producing activities but it appears that reserves will soon be exhausted. Bulolo Gold Dredging Ltd. operated only dredge No. 4 at year end, No. 5 having been closed down permanently in May. Remaining gravel reserves amount to approximately 19,000,000 cubic yards of which half is suitable for dredging and half for sluicing.

In the year ended 31st May, Bulolo Gold produced 51,693 ounces of gold and 20,597 ounces of silver from 8,211,000 cubic yards. In the following six months, 17,315 ounces of gold were recovered from 3,075,000 yards. The only other producer of note is New Guinea Goldfields Ltd. with an output of about 1,000 ounces per month. Total New Guinea gold output in 1957 is estimated at 55,000 ounces.

Consolidated Zinc Pty. Ltd. commenced an investigation of the Astrolabe copper field near Port Moresby.

Some interest was taken in possible nickel-bearing deposits but nothing of economic size was discovered.

The Administration is attempting to encourage prospecting. It has brought into operation an ordinance providing loan assistance for the investigation of mineral deposits. Recent amendments to mining ordinances provide for special prospecting grants of areas of up to 1,000 square miles and exclusive prospecting licenses for areas of up to 25 square miles.

### NEW ZEALAND

Estimated 1957 gold output is 30,000 ounces. Prospects for 1958 are that about the same quantity will be produced. Three dredges operated at Alexandra, Arahuera, and Taramakau. These account for 90 percent of gold production. The leading producer was Kanieri Gold Dredging Ltd. at Taramakau. Monthly returns were from 1,000 to 1,300 ounces of gold obtained by treating 320,000 to 400,000 cubic yards of gravel. New Zealand dredging costs are claimed to be the world's lowest at under sixpence (Stg.) per cubic yard.

Lime and Marble Ltd. continued prospecting for uranium on the north side of the Buller River. The area is precipitous, covered with dense vegetation, and has a high rainfall, so that prospecting is both arduous and difficult. Float boulders containing radioactive material were found in creek beds and have been traced to their source. Prospecting has been confined to what appears to be the most persistent and richest horizon located. A

helicopter has been used in the work and an access track is under construction.

Proposals to develop vast deposits of iron-sands have been taken a stage further with the formation of a local company which aims to attract large-scale capital from overseas. Negotiations have taken place with British interest and German interest was also reported. Two Australian companies have reportedly been approached. The "Taranaki iron-sand" (titannomagnetite) of the North Island is estimated to contain over 700,000,000 tons approximating to the composition: Fe 60 percent and Ti 6 percent. Ilmenitic beach sands of the South Island's Westland are estimated to total nearly 1,000,000 tons averaging Fe 33 percent and TiO<sub>2</sub> 27 percent. Since great power developments are taking place in New Zealand, especially in the South Island where one scheme alone—Benmore—will cost £36,000,000 and ultimately produce 480,000 kilowatts, a smelting project may succeed if capital can be attracted on a grand scale.

### REPUBLIC OF THE PHILIPPINES

The year 1957 witnessed continued progress in the Philippine mining industry, but the rate of increase in production value slowed considerably as a result of the drop in mineral prices.

Gold production decreased, but copper for the second consecutive year was number one mineral product in value of output with an all-time tonnage peak.

Chromite remained the brightest spot in the mining industry although there was a weakening demand during the last half of 1957.

Iron ore output was a little lower, but there is an encouraging outlook in the industry. Iron mining and beneficiation in the Philippines is undergoing a transition in technology, although still on a small scale, in line with modern operations in other countries.

There was a larger but sporadic production in manganese, and a further increase in output of mercury to an all-time high.

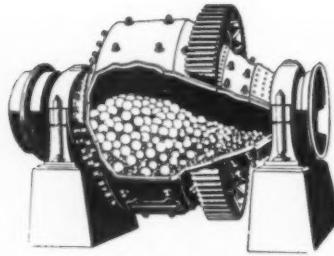
Gold output was 379,982 ounces from 10 mines in 1957, compared with 406,163 ounces from 12 mines in 1956.

There was a small gain of two percent in value of production due to higher prices which, in turn, resulted from active buying by holders of "blocked pesos," who pay for the gold in pesos and receive \$35.00 per ounce from the Central Bank. As a result of this buying, the price in the Manila market reached as high as 127 pesos (\$63.50 at official rate of ex-

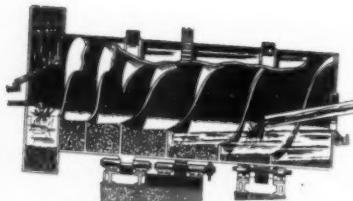
#### Production of Metals and Ores in the Philippine Islands for the Years 1951, 1952, 1953, 1954, 1955, 1956, and 1957<sup>1</sup>

Commodity	1951	1952	1953	1954	1955	1956	1957 <sup>1</sup>
Gold <sup>2</sup>	393,602	469,408	480,625	416,052	419,112	406,163	379,982
Silver <sup>3</sup>	274,602	693,751	572,046	502,069	N.A.	541,168	479,216
Chromite <sup>4</sup>							
Metallurgical Refractory	32,736	52,364	88,541	62,595	59,745	127,370	113,358
Iron ore <sup>5</sup>	301,835	491,150	468,549	388,590	535,262	581,685	612,158
Copper <sup>6</sup>	903,282	1,170,153	1,217,864	1,424,898	1,432,712	1,440,232	1,346,363
Manganese ore <sup>7</sup>	12,712	13,264	12,715	14,349	17,461	20,963	40,382
Lead <sup>8</sup>	22,343	20,627	21,508	9,393	11,912	4,414	30,231
Zinc <sup>9</sup>	571	2,300	1,434	1,827	2,318	2,140	814
Mercury <sup>10</sup>	155	1,596	747	—	—	950	302
	—	—	—	—	635	3,015	3,363

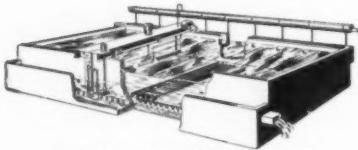
1. Estimated. 2. Fine ounces. 3. Metric tons. 4. Flasks (76 pounds).



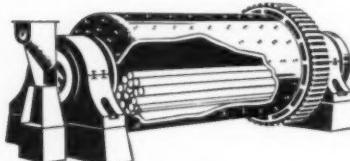
CONICAL MILLS



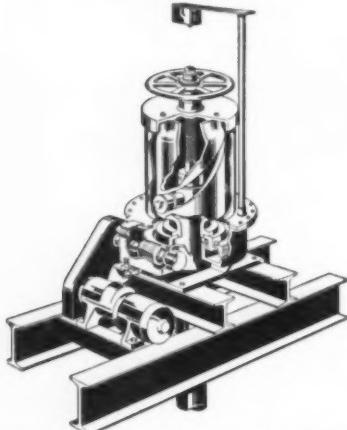
COUNTER-CURRENT CLASSIFIERS  
HEAVY-MEDIA SEPARATORS



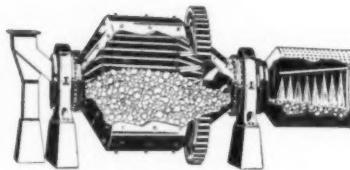
AUTOMATIC BACKWASH SAND FILTERS



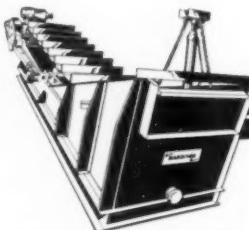
ROD MILLS



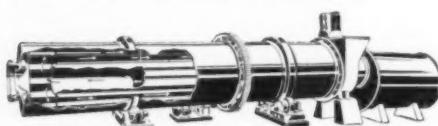
"AUTO-RAISE" THICKENER MECHANISMS



CONICAL ORE SCRUBBERS



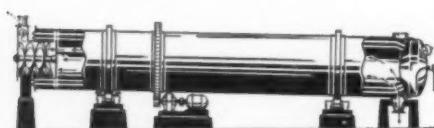
OVERDRAIN CLASSIFIERS



DOUBLE-SHELL, SEMI-DIRECT COAL DRYERS



HORIZONTAL ROTARY KILNS



STEAM-TUBE ROTARY DRYERS



"GYROTOR" AIR CLASSIFIERS

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## Oceania

change) during the year, with the annual average at 120.24 pesos, compared with the average of 109.76 pesos in 1956.

One small mine, Benguet Exploration, Inc., went into production in September with a mill of 50 tons a day. While the mine contains high-grade ore which enables the company to show profit from operations, the managers, Philex Mining Corporation, have no plan now to increase the mill capacity beyond 50 tons to keep down overhead.

The combined production of the two biggest mines, Benguet Consolidated, Inc. and Balatoc Mining Company, which are under one management, again accounted for more than 50 percent of total gold production in 1957. Benguet Consolidated, produced 116,478 ounces, compared with the 1956 production of 119,805 ounces. Balatoc Mining increased production to 102,622 ounces from the previous 96,480 ounces.

Baguio Gold Mining Company is developing more ore at the property of Gold River Mining Company which was acquired in 1957 through merger of the two companies. Production dropped to 29,370 ounces from the 1956 total of 31,468 ounces.

Ilogen-Suyoc Mines, Inc., was treating 650 tons of ore a day at the company's Ilogen mine, where increase in milling capacity was completed in October from 500 tons. Production increased to 31,505 ounces from 28,774 ounces reported in 1956. The company is rushing the installation of the new 300-ton mill at the prewar Suyoc mine and work to reopen the underground workings is in progress. Reopening of the 9,400-foot Palidan deep level tunnel was completed in December. The tunnel has been timbered and is now being used as a drainage for the Suyoc mine. Tracks have also been laid on one side of the tunnel for ore cars for transporting ore from the mine to the new mill which is scheduled to be completed during the third quarter of 1958.

Copper production continued to increase to an all-time peak, but the value was a shade lower than in 1956 due to the decline in prices. Total production was 40,382 metric tons.

The increase in quantity was contributed principally by the Toledo mine of Atlas Consolidated Mining and Development Corporation, whose mill treated 12,000 tons of ore a day. The gradual increase in capacity was finally completed in 1957 from the original capacity of 4,000 tons when the mill started operation in 1955. Atlas produced a total of 17,273 metric tons of copper.

The company concluded last year an agreement with the Newmont Mining Corporation of New York, New York whereby Newmont would undertake at its own expense to develop ore reserves at the Toledo mine. In addition, Newmont will undertake exploration work, also at its own expense, in areas outside the Toledo mine, and if it develops not less than 5,000,000 tons of proven copper ore suitable for open-pit mining operations, it will receive as compensation 12,500 shares of Atlas stock for every 100,000 tons of proven ore.

One new copper mine, Sipalay, on Negros island, went into production in May with a mill of 4,000-ton daily capacity. This is the second mining operation of low-grade disseminated copper ore in the Philippines, the first one being the Toledo mine of Atlas Consolidated. Production during eight months of op-

## Oceania

eration amounted to 2,281 metric tons of copper. Marinduque Iron Mines Agents, Inc., owners of the mine, has plans to increase the mill capacity to 6,000 tons.

Marinduque also owns the Bagacay copper mine on Samar Island, and is mining and shipping high-grade ore to Japan. Production showed an increase to 5,364 metric tons of copper from 42,085 tons of ore shipped during 1957, compared with 2,103 tons of copper from 15,269 tons of ore shipped in 1956. It is also the plan of the company to erect a concentrating plant on this property as soon as sufficient ore reserves are developed.

Lepanto Consolidated Mining Company produced an estimated 12,991 metric tons of copper compared with 11,667 tons in 1956. Gold production was 45,326 ounces, 43,798 in 1956.

Mindanao Mother Lode Mines, Inc., operating the Cabapa copper mine, increased production by 60 percent to 2,222 tons of copper compared with 1,385 tons in 1956.

The Santo Tomas copper project of Philex Mining Corporation is scheduled to start production early in June with a 2,000-ton mill being rushed to completion at year's end. The mill has been designed to treat eventually 3,000 tons of ore a day and the mine has possibilities to become one of the country's major copper operations in the future.

Consolidated Mines, Inc., whose property is operated by Benguet Consolidated, Inc., accounted for the country's total exports of refractory chromite except for a trial shipment of 895 tons made by a small mine.

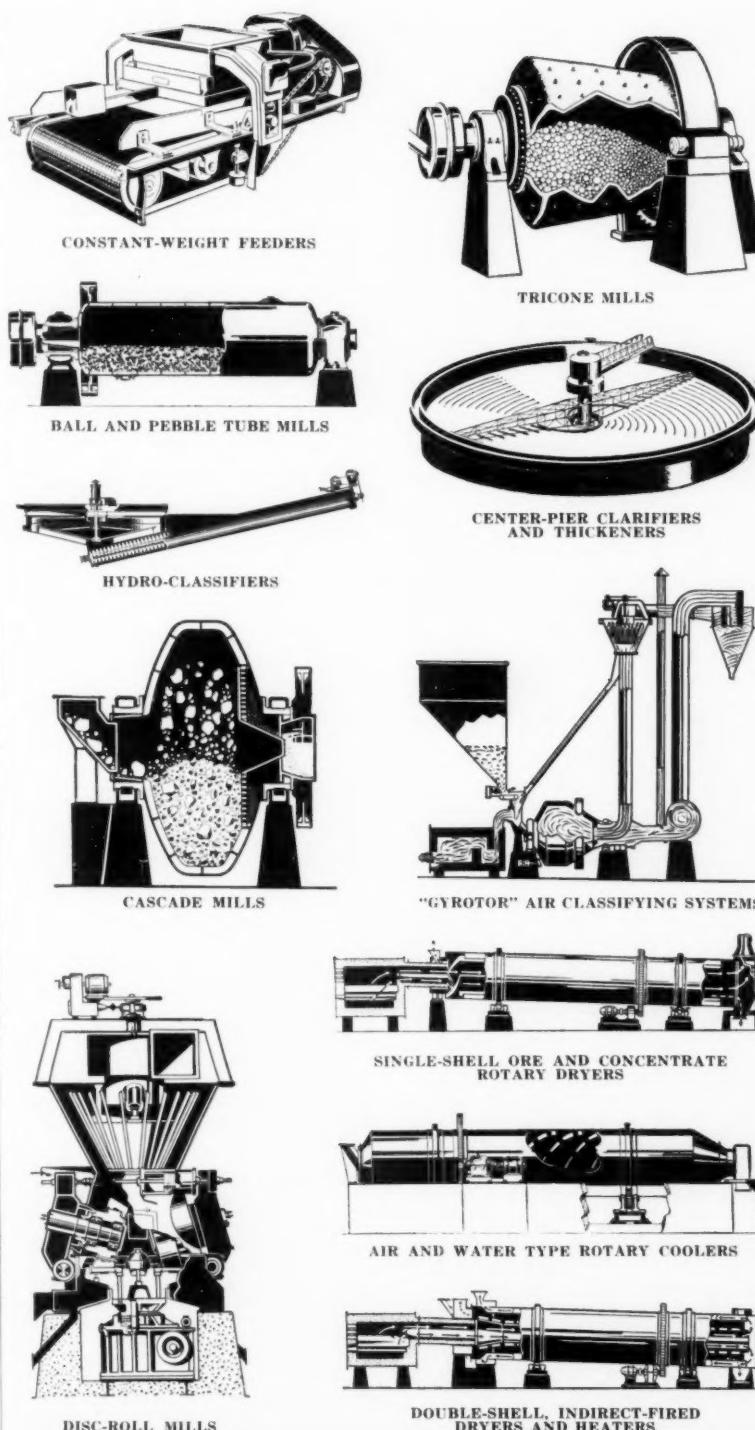
Acoje Mining Company, biggest producer of metallurgical chromite, showed a drop in shipments during 1957 to 96,158 metric tons compared with the previous year's total of 113,957.

Mati iron mine, operated by Atlas Consolidated, showed increased output of 163,374 metric tons, compared with the previous total of 94,328 tons. Further increase in production should be recorded in 1958 as the operators are installing additional mine machinery and equipment to increase ore reserves.

Philippine Iron Mines, Inc. shipped a total of 1,019,906 tons during 1957, compared with 1,045,851 tons in 1956. It is expected that production during 1958 will increase with the completion of the 6,000-ton beneficiation plant.

There was a revived activity in manganese mining due to barter trade allowed under Republic Act No. 1410, and except for some 5,000 tons of high-grade ore shipped to the United States, all shipments were reportedly made to Japan under barter trade. Production reached the highest record since 1950 at 30,231 tons. There were eight mines in operation but production was sporadic and not one company was able to make regular monthly shipments.

There is still only one mercury mine in the Philippines but it is now considered as one of the world's important quicksilver mines. Two or three companies were exploring quicksilver deposits but have not disclosed any plans for future operations. Palawan Quicksilver Mines, Inc., increased production during 1957 to an estimated 3,363 flasks. The company is installing another Gould rotary kiln, the third unit at its present plant on Palawan island, which will further increase production during 1958.



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# LATIN AMERICA

## ARGENTINA

During 1957, the new national policy of recovery and economic improvement influenced all departments of the government. On May 1, 1958 this provisional government will be replaced by constitutional authorities. Among the achievements of the provisional government were the creation of an autonomous Banco Industrial whose capital was increased to \$3,000,000 (in the future it will develop as an economic bank with a particularly strong mining division), and the revival of the railway system which is so vital to development of the Argentina mining districts.

Exploration for and mining of tungsten increased during the past year. National output was about 2,000 tons, making Argentina second largest tungsten producer in South America. About 90 percent of the production came from San Luis Province with the Arrequintin company now operating its new flotation plant.

Exploration and investigation of the Sierra Grande hematite and magnetite ores in Rio Negro province were carried out successfully during the year. It is believed that at least 100,000,000 tons of high-grade iron ore exist in the area.

National Lead Company, the country's largest lead producer, completed the differential flotation plant at Castano Viejo, San Juan province. It now produces concentrate containing 600 tons of lead and 700 tons of zinc monthly for Argentina's use.

Mining of copper was resumed at Cerro Famatina, La Rioja province, but the outlook for this operation is discouraging because of government regulations which will permit larger imports.

## BOLIVIA

The Bolivian government's mining agency, Corporacion Minera de Bolivia, found the status of many of its mines steadily declining by the end of 1957. Several mines had suffered heavy losses. Improper legislation and mismanagement have been the principal causes. Tin exports declined for the fourth straight year - 26,600 tons. In 1956, 27,336 tons.

A serious effort is now being made to pull these operations "out of the red." Acting on some of the recommendations made in the report of the United States firm of Ford, Bacon & Davis, consulting engineers, the government had decided at year's end to close some of the so-called marginal mines which were working at a loss. The workers were being sent back to agricultural districts from which they came if they could not be placed in other privately operated mines. A special commission of Ford, Bacon & Davis was studying the possibilities of re-equipping the Catavi, Colquiri, and Huanuni tin mines and improving the financial status of the three units.

There were some bright sides to the Bolivian mining situation, however. National Lead Company finally obtained an option on the Matilda zinc mine, which belonged to the Mauricio Hochschild group before its nationalization. The Matilda is actually a collection of various mining enterprises and accessory plants in the districts of Timusi, Ancoraimas, and Carabuco. Abundant deposits of zinc,

lead, copper, silver, and gold have been found in the area.

Ventures Ltd. and Vitro Corporation America reached an agreement in principle with the Bolivian government for large-scale minerals exploration in the Andes Mountain. A joint company, called Bolivex Exploration Company, was set up to carry out a two-year program at a cost of about \$200,000.

The German firm of Krupps made smelting tests on Bolivian tin ores. Tests with the Waelz volatilization procedure appeared to be encouraging, making a high-grade dust from very low-grade concentrates. Placer Development Ltd. also expressed an interest in Bolivian tin. The firm reportedly approached the government for permission to erect a tin concentrator which would treat the dumps at Catavi.

W. R. Grace & Company continued its operation of the Chojilla tungsten mine and the Tanapaca tin mine. In the latter they discovered good ore and monthly tin production increased five-fold during the year. Through the International Mining Company which it controls, Grace also took an option on the Ocuri property, originally Chilean owned, and will sample the gold placer again. The firm appointed a consulting engineer during the year who will supervise mineral activities in Peru, Chile, and Bolivia.

## BRAZIL

Brazilian mineral production and the metallurgical industry were of great importance to the country in 1957. The government was highly interested in expanding the capacity of the existing steel plants to increase steel production from 1,000,000 tons to 2,000,000 tons by 1960. Two new steel companies, COSIPA and USIMINAS, had substantial help from the government. Cosipa had a loan of 2,000,000,000 cruzeiros, and Usiminas received 3,200,000,000 cruzeiros. Usiminas group will be financed by Japanese capitalists (40 percent). Both will enlarge steel production by 900,000 metric tons. Cosipa will be built in Piaçaguera, close to Santos, State of São Paulo, and Usiminas will build its steel plant at Acesita, Rio Doce valley, State of Minas Gerais.

Volta Redonda, in the near future, possibly in 1960, will be able to enlarge its production to 1,000,000 tons (ingots). To do it Volta Redonda received \$35,000,000 from the Export-Import Bank in 1956, its fourth financing help. With this sum the Bank has contributed \$105,000,000 to Volta Redonda.

The Cia. Ferro e Aço de Vitória, State of Espírito Santo, another steel plant, was expanded in 1957 and will be producing 100,000 tons.

To meet estimated aluminum consumption in 1960 of about 46,000 tons, in 1957 the two existing plants started a program to enlarge their output. The Elquisá plant, Ouro Preto, State of Minas Gerais, will be able to produce 8,800 tons in 1958, however, there is a new plan to increase the production to 15,000 tons. The Companhia Brasileira de Alumínio, located at Alumínio, State of São Paulo, is already producing 10,000 metric tons and is preparing to increase it in 1960.

According to present plans, Brazilian aluminum production in 1960 will be 18,800 tons; by 1962, Brazilian production will reach 42,000 tons. New projects con-

cerning the aluminum industry are being considered. One of them will be established in the Paulo Afonso region; the other in Poços de Caldas region, where the most important bauxite deposits of Brazil are situated.

Brazilian exports of manganese ore were considerably increased in 1957. Tonnage over the past seven years shows this fluctuation: 1950 143,000 tons; 1951 121,000 tons; 1952 163,000; 1953 168,000; 1954 97,600; 1955 168,000; 1956 205,000; 1957 690,000 tons.

## BRITISH GUIANA

The most significant fact about last year's activities in the mining industry is that definite steps have now been taken to develop the manganese deposits in the northwestern part of the territory. Two companies are preparing for production: African Manganese Co. (Mines Management) Ltd. plans to install three crushing and washing plants with a capacity of 30,000 tons of manganese concentrate a month, and North-Western Guiana Mining Co. Ltd. (a subsidiary of the Union Carbide and Carbon Corporation) is erecting a plant capable of producing 30,000 tons a month by 1961. A 38-mile railroad will also be constructed so that the ore can be transported to the point of shipment. Work has also been started on constructing a ship turning basin and loading station at Sebai Kaituma River and a railroad from there to the mine at Matthews Ridge.

Bauxite production by the two major companies operating in the Colony was adversely affected by a strike at the Arvida smelter which forced the reorganization of storage facilities at Chaguaramas which, in turn, caused a slowing down of mining.

Demerara Bauxite Company acquired the properties of Plantation Bauxite Company Ltd. at Christianburg but did not mine there.

A comparison of bauxite production in long tons for the years 1956 and 1957 is given below:

	1957	1956
Demerara Bauxite Co.	1,976,880	2,236,440*
Reynolds Metals Co.	225,023	244,526
Total	2,201,903	2,480,966

\* Includes tonnages worked on behalf of Plantation Bauxite Co.

Diamond production amounted to 29,037 metric carats, a decrease of nearly 800 carats from the 1956 total. The entire production came from shallow workings or land claims, the dry weather drastically reducing the water supply available for washing.

Cold production was increased because of a small but relatively rich strike which was made in the Akaiwong area of the Cuyuni River where 200 men produced about 4,000 ounces of alluvial gold mostly in nugget form.

A comparison of gold production in troy ounces for the years 1956 and 1957 follows:

	1957	1956
British Guiana Consolidated Goldfields Ltd.	10,578	12,759
Other Groups	1,900	1,663
Individual Small-Scale Workers	4,013	1,393
Total	16,491	15,815

## Latin America

### CHILE

The mining industry in Chile had a good year in 1957. Production was high in the larger copper mines as well as in the nitrate properties and there was increased activity in iron mining. The Chilean Government did not take any steps to decrease the production of copper in spite of the falling world market price of this metal. The Caja de Credito Minero, which is the government ore buying agency, helped many of the smaller operators to keep in production by continuing to purchase copper ores and concentrates at prices which were equivalent to roughly 30 cents per pound. In spite of this assistance, many of the marginal operators were forced to close. Increased operating costs caused by inflation, with decreased returns because of the dropping price of copper, brought about these shut-downs. The value of the peso fell about 40 percent with the official exchange going from approximately 500 pesos to the dollar at the start of the year to very near 700 pesos at the end of December.

The Chuquicamata mine of the Chile Exploration Company increased output of copper by about 1.5 percent, going from 532,008,343 pounds in 1956 to approximately 540,195,146 pounds in 1957. However, this increase does not truly reflect the activity that has gone on at this property, where the total tonnage of overburden and ore moved daily has increased to roughly 140,000 tons. This tonnage has been made possible through the purchase and acquisition of new locomotives, shovels and two rotary drills.

At the Andes Copper Mining Company mine at Potrerillos, copper production went up about 1.3 percent, from 86,330,173 pounds in 1956 to approximately 87,437,221 pounds in 1957, in spite of diminishing ore reserves. The concentrator, which can handle approximately 24,000 tons of ore per day, has been working to capacity. In the meantime, development work on the new El Salvador mine, which is to replace the Potrerillos mine, is more than satisfactory. The Inca Adit at El Salvador, has been driven over 3,300 meters, which is well beyond the half-way mark. Work will soon get under way on a turnout for the main haulage drift, which will lie beneath the ore passes and loading chutes. The 2600 and 2660 meter levels are also being pushed to speed development of the block caving system. It is estimated that the El Salvador ore body contains 500,000,000 tons of 1.6 percent copper ore and that production will get under way in 1959.

The Braden Copper Company mine at Sewell had a lower production in 1957 than during the previous year. It produced approximately 339,024,483 pounds in 1957 as against 347,826,000 pounds in 1956, which represents a decrease of 2.6 percent. Production fell off in April and continued below that of last year through September. This can generally be attributed to labor troubles as there was ample water as well as electricity available throughout the year.

The medium and small copper mines felt the impact of the falling world market price of copper; few of them were able to make sales against future deliveries, thus assuring themselves of what their returns might be. Production figures

on these mines are difficult to get and often incomplete. However, it is known that the Caja de Credito Minero exported 9,241 metric tons of copper in the form of ores and concentrates in 1955 as against 13,874 tons in 1956 and 5,468 tons during the first six months of 1957. During the same periods 14,134 tons, 15,452 tons, and 7,779 tons, respectively, of blister were exported by the Paipote Smelter, which is located near Copiapo. Since the price of copper dropped more rapidly in the last half of 1957 than in the first half, it is reasonable to assume that the production of copper ores and concentrates of the medium and small mines will be well below that of 1956. Among the medium-sized producers those in the strongest position at the end of 1957 were the mines operated by Cia. Mineray Comercial Sali Hochschild, Cia. Minera Disputada de Las Condes, and Cia. Minera du MZaita, which have foreign capital behind them. Cia. Minera Cerro Negro, which is owned jointly by the Caja de Credito Minero and the Corporacion de Fomento, has had a fairly good year and should continue to operate throughout 1958 since they have reported locating a rich deposit in their mine out of Cabildo. On the other hand, Cia. Minera Tocopilla, which was the principal medium-sized mine in the north of Chile, ceased operations at its Tocopilla mine due to labor difficulties and is merely working over old dumps. It is doubtful that this mine will resume operations in view of low copper prices. Callejas y Cia. which operates a number of small mines in the north have threatened to curtail mining activities unless some help is forthcoming from the Chilean Government.

The iron ore production of Chile, though relatively small in comparison to that of copper, is fast growing in importance with an increasing number of producers in the Ovalle, La Serena, Vallenar, Copiapo, and Chanaral areas. Of the existing iron ore producers, the Bethlehem (Chile) Iron Mines are working the largest deposit at the Romeral mine near La Serena where there are an estimated 20,000,000 tons of reserves. Production at this mine is not being pushed as Bethlehem seems interested in producing only enough ore to comply with the contract to supply the steel mills at Huachipato. The firm is continuing to buy iron ore from small producers in the area and shipping upwards of 100,000 tons of ore per month including shipments to C.A.P.

Cia. Minera Santa Fe has been expanding its activities and production from its mines in the Ovalle, Cristales, and Chanaral areas. This company has been installing a system for mechanized loading at the port of Chanaral. There are three other companies that merit mention in the production of iron ore. These are Cia. Minera Santa Barbara, at Vallenar, Cia. Minera Cerro Colorado, and Cia. Minera Cerro Iman at Vallenar and Copiapo, the latter two being subsidiaries of the Cia. Salitrera Tarapaca-Antofagasta, which still has fairly important nitrate holdings in Chile.

#### Copper Production in Chile by the Anaconda Company and Kennecott Copper Corporation Mines in Pounds for 1955, 1956, and 1957

Mine	1955	1956	1957
Anaconda (Chuquicamata)	461,482,227	532,008,343	540,195,146
Anaconda (Potrerillos)	84,699,879	86,330,173	87,437,221
Kennecott (Braden)	309,942,000	347,826,000	339,024,483

It is interesting to note that the production of nitrates for the first nine months of 1957 was 18 percent higher than for the corresponding period of 1956, going from 824,106 metric tons in 1956 (January-September) to 972,124 tons in 1957. During these same periods, the production of iodine, which is a by-product of the Chilean nitrate industry, went from 468,247 kilograms to 938,801 kilograms or an increase of 110.1 percent.

During 1956, there was a three-month strike at the nitrate properties of the Cia. Salitrera Anglo Lautaro's Maria Elena and Pedro Valdivia mines. These two properties account for better than 50 percent of the nitrates produced in Chile. Anglo Lautaro personnel advise that production is still below what it should be as a result of this strike, and it is hoped to get Anglo Lautaro production back to normal during 1958.

Within recent months, the Cia. Salitrera Tarapaca-Antofagasta has reduced its operations to two properties, Victoria and Humberstone, while Luis Uruticoechea has also cut down to two working properties: Algorta and Granja. In the Antofagasta "pampa," the only other nitrate company in operation is Cia. Salitrera San Martin, while in the Taltal "pampa" Cia. Salitrera Iquique operates Chile mine and Alemana mine and Cia. Salitrera Flor de Chile operates Flor de Chile mine. There is one other nitrate producer in Chile which is Cia. Salitrera Santo Rosa de Huara working inland from Iquique. It is doubtful, however, that this little company will long survive in view of increased costs and antiquated working methods.

### COLOMBIA

During 1957 South American Gold & Platinum Company acquired all of the outstanding ordinary and preference shares of Frontino Gold Mines Ltd. in exchange for South American Gold's six percent, eight-year debentures making Frontino a wholly owned subsidiary. In 1956, South American Gold had added substantially to its holdings in Frontino, and the management of Frontino had suggested that South American offer to buy the capital stock of those stockholders who did not wish to retain their interest in the company under new management and financial policies.

During the year, South American Gold stockpiled much of its gold and platinum because of a new 15 percent export tax. Production of gold during the first half of the year was 74,946 ounces, while platinum output during that period totaled 6,659 ounces.

St. Joseph Lead Company entered the field with an 88 percent interest in a new firm called Cia. Minera San Jose Inc. The latter had been granted a mining concession for exploration of a promising lead outcrop near Bogota. Exploration work continued during the year.

During the six-month period ended June 30, 1957, Pato Consolidated Gold Dredging Ltd. dredged 12,395,000 cubic yards to recover 49,814 ounces of fine

## Latin America

gold, compared with 13,407,000 cubic yards to recover 110,910 ounces in the same period of 1956. During this period, the No. 2 dredge was unproductive while undergoing repairs and alterations and moving to a new location. In the second quarter of 1957, dredges No. 1 and 4 were digging flotation toward new dredging sites with a consequent reduction in output.

### ECUADOR

During 1957 Compania Industrial Minera Asociada (CIMA) increased its output of gold from 14,652 ounces in 1956 to 16,017. The firm has been seeking to extend its reserves and now has

enough to ensure operations for another two years. They have reopened old workings of the South American Development Company for exploration, and have also located a vein on a small concession at Ayapampa, about 23 kilometers from Portovelo. Both are being mined and shipped to the company mill at Portovelo which is currently handling about 170 tons daily from these and other properties.

The Ecuadorian Mining Company which had sulphur operations at Tixan, did not produce during 1957. The owner of the property, Executive Board of Public Assistance of Chimborazo, has offered the concession to the highest bidder.

A number of concessions were granted by the government last year. Among them are the following: Enterprise Ecuadori-

anna Company Ltd., in the province of Guayas, to mine iron ore; National Mines, in the province of Pichincha and Cotopaxi, to develop copper and zinc minerals, and in the provinces of Rios and Cotopaxi for auriferous washing plants; C. Suarez and J. Simon, in the province of Cotopazi, to mine nickel and other metals; L. B. Kishle and P. Carrasco, province of Napo-Pastaza for auriferous washing plants; Gustavo Diez Delgado, province of Pichincha and Cotopaxi, to develop copper, lead, and zinc; Julio and Arturo Vinueza, province of Azuny, for lead and copper, gold and silver.

### GUATEMALA

Guatemala's mining industry is growing rapidly, spurred by attractive concessions granted by the Government, and a chance to explore practically virgin country insofar as mines are concerned.

The Compañía Minera de Guatemala, S. A. and Compañía Minera de Huehuetenango, S. A. have at present the two largest operations. The former runs and efficiently manages operation of mine and flotation mill at Caquipec, Alta Verapaz treating a monthly tonnage of 6,863 tons. 1957 output was 11,206 tons of lead concentrate and 15,436 tons of zinc concentrate. The latter company is operating a mine and modern oxide lead flotation mill at Villa Linda, Huehuetenango, which milled 30,736 metric tons of ore of 13.2 percent grade in 1957.

Looking over the field and attempting to gain a foothold are: Minas Verapaz, S. A., subsidiary of Eagle-Picher Company, and recent acquire of the Purulhá mine from the Compañía Minera de Guatemala, S. A.; Compañía Minera Maya, S. A., an exploration enterprise in which the San Luis Mining Company and the New Port Mining Company have interests; Hanna Coal and Ore Corporation, which recently acquired exploration rights to 62,000 hectares of ground in the Lake Izabal area; W. R. Grace & Company and Bunker Hill Company, who have joined forces and placed geologists in the field for an active search; Minas de Guatemala, S. A., subsidiary of American Zinc, Lead & Smelting Company, which is diamond drilling a prospect near Chiantla, Dept. of Huehuetenango; and Kelly Safie y Cía, Ltda., which plans to mine a high grade antimony vein.

Other companies recently formed are: Promotora Minera, S. A., Explotadora Minera Quiché; Compañía de Minas Trinidad Limitada, Compañía Minera Los Altos Ltda.; Explotadora Minera de Choacús, and Mid-America Minerals Association.

There are at present no smelters operating in Guatemala. A few tons of lead metal are obtained by crude smelting of high-grade ore by a few small mine owners and lessees. This lead is all for local consumption.

### PERU

With the current world situation one of declining prices for lead, zinc, and copper, the Peruvian mining industry fortunately is able to turn to iron ore developments to supplement its income. Marcona Mining Company has passed the 10,000,000-ton mark in shipping high-grade iron ore through the Port of San

## FABRICATED

## STAR BITS

The Fabricated Star Bit shown here has been designed especially for big hole drilling in hard formations. Far more efficient than the old style spudding bit and the big hole paddle-type bit, these Star Bits are custom-engineered to suit the particular hole size and the capacity of the drilling machine used.



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## Latin America

Juan and is now operating at a rate of around 3,000,000 tons annually. (1957 shipments totalled 3,239,094 long tons).

Adding great impetus to future Peruvian iron ore production was the granting at year's end of a \$4,800,000 credit by United States interests to Pan American Commodities, S.A., to finance the Acari iron ore project. First steps are already underway. These include construction of a new pier at San Juan Bay and a 50-kilometer highway connecting the port with the mine. First shipments are expected to begin in the middle of 1958 at a rate of 1,000,000 tons annually.

The \$200,000,000 investment in the Toquepala copper project by Southern Peru Copper Corporation is already running over that figure. Latest estimate indicates an additional \$30,000,000 will be needed to bring the mine to production. In 1957, the \$3,000,000 mole and pier at Ilo were completed by Foley Brothers; warehouses, townsite, and housing were almost completed; and the largest part of the rail line from the port to the mill had been laid. Completion date is set for 1960.

Cerro de Pasco Corporation finished its \$25,000,000 hydroelectric power project in 1957, and began transmitting power from the new plant to Oroya, where Cerro de Pasco's lead-zinc smelting and refining operations are located. Open-pit copper mining was started on a small scale at the Cerro de Pasco mine in the Central Peruvian Andes, during the year; there the firm used power shovel mining for the first time. Plans were made during the year for a more thorough examination during the 1958 dry season of the Antamina copper property about 100 miles northwest. This property is estimated to contain about 100,000,000 tons of 1.5 percent copper. Unfortunately toward the end of 1957, the firm announced an 11 percent cutback in copper output as a result of the prevailing unfavorable market conditions and the status of some of these newer projects remains uncertain.

The low non-ferrous prices forced Volcan Mines Ltd. to stop work at its Carahuacra mine and concentrator. Operations were also reduced at the firm's Ticlio concentrator high in the Andes Mountains. Minerals Inc. decided not to develop the Chavin lead-zinc-copper-silver mine. Consolidated Guayana Mines then reorganized as Latin American Mines Ltd. and placed the Chavin on a standby basis until higher metal prices enable reopening of the property.

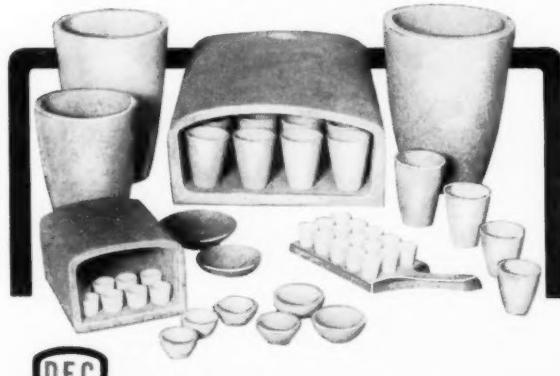
St. Joseph Lead Company and Santander Mining Company formed Compania Minerales Santander Inc. to mine lead-zinc-copper-silver deposits near the headwaters of the Chancay River, west of the Rio Pallanga mine. Output is scheduled for the middle of 1958.

Cia. Minera Condoroma, S.A., operating the Condoroma lead-zinc-silver mine in the province of Espinar, department of Cuzco, decided early in the year to double capacity of its concentrator to 200 tons daily. Exploration had proved 240,000 tons of ore in the Condoroma property and 100,000 tons in the nearby Kata property.

## MEXICO

Mexico's largest increase in metal production in 1957 came in the production of manganese ore. Total output in 1957 was 791,253 metric tons, compared with

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## Latin America

Mine Production of Metals and Minerals in Metric Tons in Mexico  
in 1954, 1955, 1956, and 1957

Commodity	1954	1955	1956	1957
Gold	12,203	11,526	11,287	18,569
Silver	1,247,207	1,461,791	1,363,803	1,486,974
Copper	52,000 <sup>1</sup>	52,245	52,924	91,150
Lead	211,681	211,211	204,406	209,744
Zinc	198,106	274,581	250,570	244,238
Iron	305,448	441,050	502,729	566,945
Manganese	79,561	37,078	487,608	791,253
Antimony	3,880	3,807	3,853	5,145
Mercury	506	1,040	726	695
Graphite	20,435	33,412	30,766	23,488
Tungsten	431	370	236	155
Arsenic	2,722	2,976	2,436	4,654
Sulphur <sup>2</sup>	N.A. <sup>2</sup>	500,000	775,000	1,000,000

1. Estimated. 2. Not Available.

487,608 tons in 1956. Much of the increase came from the Autlan district of

the state of Jalisco where Bethlehem Steel Corporation has a substantial interest.

Another large producer was the Parian district of Oaxaca state.

Mercury metal output decreased in 1957. The tonnage produced amounted to only 695 tons, compared with 726 tons in 1956, and 1,040 tons in 1955.

The Federal Government, through its Mint Department, produced silver coins valued at \$59,676,450. The country produced 1,486,974 metric tons of silver during the year, compared with 1,363,803 in 1956. Much of this was shipped to West Germany.

Sulphur (Frasch process) output hit an all-time high of almost 1,000,000 metric tons; 775,000 in 1956 and about 500,000 in 1955. Mexico is now the world's second largest producer and exporter. In 1957 exports were about 850,000 tons, of which about 500,000 were to the United States. Largest producer was Pan American Sulphur Company which shipped 678,000 tons in 1957. Gulf Sulphur Corporation shipped 170,000.

All production comes from the Isthmus of Tehuantepec where Texas Gulf Sulphur Company's \$10,000,000 plant operated throughout the year and stockpiled about 100,000 tons. Freeport Sulphur Company is financing an exploration program with the Sulphur Exploration Company on a 29,000-acre concession. If sulphur is found a plant will be built.

Texas International Sulphur Company's new 350-ton-per-day plant was building during the year and should reach production in 1958 from its Frasch operations near Texistepec.

A 47,665-hectare mining zone in the state of Oaxaca was removed from the jurisdiction of the Commission for Mining Development and turned over to the National Nuclear Energy Commission for exploration and development of uranium, thorium, and other radioactive metals. The region takes in the municipalities of Telixtlahuaca, Sosola, and Etla; concessions already granted in the area will not be affected.

## SURINAM

Bauxite exports totaled 3,377,000 metric tons which is slightly less than previous year's record of 3,482,500 metric tons. Demand for bauxite mined by Alcoa's subsidiary Surinam Bauxite Co., Ltd. went down, which was but partly compensated by raised shipments by Billiton Company of Surinam, Ltd. to Olin Mathieson Chemical Corporation. However, value of exports amounted to nearly \$27,000,000 against \$24,000,000 in 1956.

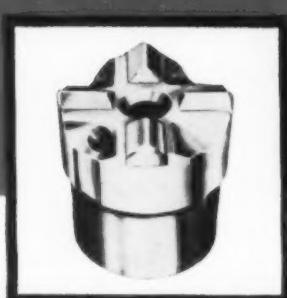
Negotiations between the Government and Alcoa concerning the \$150,000,000 Brokopondo multi-purpose hydro-electric project were completed by the end of the year. Final decision was arrived at in January 1958, when Surinam's legislative body officially approved the project and the final 75-year joint venture agreement was signed.

Moengo mine of Surinam Bauxite Company, Ltd. shipped a total of 1,996,500 metric tons of bauxite compared with 2,138,000 metric tons in 1956. Shipments in 1957 included 1,798,500 metric tons of metal-grade bauxite, 116,000 metric tons of calcinated bauxite, and 82,000 metric tons of chemical-grade bauxite, all grades coming from the Ricanau Hill deposit.

Paranam mine of the same company shipped 568,000 metric tons of metal grade bauxite, coming from the Rorac and Truly Hill deposits, against 759,500

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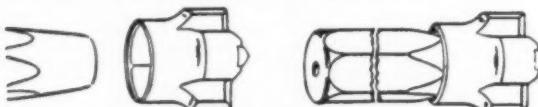
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## Latin America

metric tons in 1956. Towards the end of the year a new jig plant was added to the heavy media separation plant treating low-grade ferruginous bauxite. Besides, the 4,500-hp diesel-electric cutterdredge went into operation to remove overburden of the buried Onoribo IV ore body. So, total shipments of Surinam Bauxite Co., Ltd., amounted to 2,564,500 metric tons compared with 2,897,000 metric tons in 1956.

Billiton Company of Surinam, Ltd. shipped 812,500 metric tons of bauxite, a substantial rise over last year's shipment of 585,000 metric tons. Included in the 1957 shipments are 17,000 metric tons of chemical-grade bauxite. Backed up by the long term delivery-contract with Olin Mathieson Chemical Corporation, the company may further raise its output in 1958 to nearly 1,000,000 tons. To achieve still higher production, the company has placed an order for a bucket-wheel excavator and a conveyor system to handle the ever increasing amount of overburden. A new kiln has been put into operation at the company's Smalkalden drying plant.

Surinam Bauxite Company, Ltd. and Billiton of Surinam, Ltd. continued their bauxite explorations in the areas surrounding their mining activities. Reynolds Surinam Mining Company, Ltd. explored for bauxite in the Corantijn River basin in northwestern Surinam. Recent discoveries of bauxite deposits in British Guiana near the Corantijn River explain the exploration activities in this area. Guiana Exploration Company, Ltd. (Kennecott) suspended its bauxite exploration program in this country.

Gold shipments to Paramaribo totaled 6,480 ounces which is again less than previous year's figure of 6,700 ounces. Sarakreed Goldfields, Ltd. shipped 3,500 ounces from its Lawa properties. The option held by U.S. interests to dredge these properties have not yet resulted in active developments. Surinam Gold Mining Company, Ltd. shipped 900 ounces from its Headly Reef. Canadian interests acquired an option to work the company's properties. Combined U.S. and Canadian interests examined the Rosebel property owned by a local miner. Though the existence of a considerable volume of gold-bearing residual clay has been inferred, the grade did not prove to be high enough to warrant further development at the moment. A hole drilled by the Government Geological & Mining Service showed sludge assays at depths between 26 and 60 meters ranging from about \$0.40 to \$9.00 per ton of recoverable sludge material.

Surinam Mining Company, Ltd. (Union Carbide & Carbon Corporation) finished the exploration of the Maripa Hill manganese deposit. The grade of the washed ore proved to be between 25 and 30 percent manganese, which is, considering the rather small tonnage of the deposit, too low to warrant mining and shipping of the ore.

Some further laboratory and field work done by the Geological & Mining Service indicated that, in the northern pegmatite belt, the occurrence of minerals like columbite-tantalite and cassiterite may likely be more extended than has been thought previously. The Service reported new discoveries of alluvial columbite-tantalite in the De Goeje Mountain in the southeast part of the country. The occurrence of some platinum in the gold-bearing gravels in this area has been confirmed by preliminary field work.

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# ASIA

## BURMA

The Government of the Union of Burma has adopted a vigorous program of encouragement for the mining industry. In 1957 these programs were conducted by the government financed Mineral Resources Development Corporation with the aid of foreign mining engineers and geologists. The Union Government decided to set up and operate an iron smelter so the M.R.D.C. intensified the search and testing of iron deposits to provide the necessary iron ore.

The Corporation also investigated, tested, and partly opened up a large zinc deposit at Loung Chaung. An all-weather road was built from the mine to Mongpaw which is 38 miles east of Taungyi in the Southern Shan States.

The Corporation opened an ore buying depot at Tavoy, equipped with a magnetic separator and assay office to buy the local tin-wolframite ore and concentrate.

The Corporation continued to work the Yadan Pone wolframite mine in the Mergui District, and during the year shipped 300 tons of mixed tin wolframite concentrate to Rangoon.

The Burma Corporation (1951) Ltd. jointly owned by the Union Government and Burma Mines Ltd. (a London Company), state that geological exploration by diamond drilling in the concession and an aerial survey over 550 square miles was made.

No new joint mining venture was entered into by the Government, but negotiations were commenced with Mawchi Mines Ltd. who work a very large Tin/Wolfram Mine at Mawchi in the Southern Shan States. It was reported that the Union Govt. would repay the £450,000 6% public loan obtained by the Company to rehabilitate the mine, and provide another £500,000 in local currency. Due to the heavy fall in the Wolfram values it is very doubtful if these negotiations will be carried further.

The Union Government wants to attract foreign capital for mining ventures. It has publicly stated that there will be no nationalization of mines for 20 years.

In 1957 production of high grade lead-zinc-silver ore from the famous Baldwin mine was 117,017 long tons (111,198 in 1956). Concentrate smelted was 47,361 long tons versus 52,306 in 1956. Ore reserves were announced by the company on July 1st as follows: 2,323,508 long tons (2,440,535 in 1956); containing 15.8 ounces silver per ton (15.7); 20.6 percent lead (20.4); 12.7 percent zinc (12.6); and 0.93 percent copper (0.89).

### Production of Metals and Minerals In Burma For Key Years From 1939 to 1957

Year	Silver <sup>t</sup>	Tin Concentrate <sup>s</sup>	Wolframite Concentrate <sup>s</sup>	Lead <sup>d</sup>	Zinc Concentrate <sup>s</sup>	Copper Matte <sup>s</sup>
1939	6,175,000	5,441	4,342	77,180	59,347	7,935
1948	415,099	1,768	378	11,596	2,943	115
1949	75,199	1,469	278	1,481	—	—
1950	—	1,750	165	373	—	38
1951	280,270	1,295	483	5,035	—	254
1952	54,783	1,306	792	9,093	4,275	134
1953	645,970	1,114	767	9,846	6,475	80
1954	1,278,289	816	443	22,561	11,283	224
1955	1,537,895	673	578	28,015	14,423	358
1956	1,358,513	1,193	1,438	14,885	13,953	379
1957 <sup>a</sup>	1,238,259	1,140	948	13,892	14,922	369

1. Ounces. 2. Metric tons. 3. Long tons. 4. 1,788 tons mixed wolframite-tin concentrates exported.

## CEYLON

There was a further recession in the graphite mining industry during the year 1957. The exports during the year were about 11 percent less than the exports for the previous year. The large mines worked continuously throughout the year on a restricted production basis. The unprecedented rains at the end of the year resulted in greatly increased inflow of water in some of the large mines thereby increasing pumping costs considerably.

The principal graphite mines continue to be worked by Messrs. Bogala Graphite Ltd., Kahatagaha Mines Co. Ltd., and H. L. De Mel & Co. Ltd.

### Ceylon Graphite Exports 1951 Through 1957 In Long Tons

Year	Quantity
1951	12,621
1952	7,659
1953	7,218
1954	7,755
1955	9,878
1956	9,207
1957	8,190

No figures for the production and value of gemstones are available. However, gemstone mining continued and it may be estimated that about 1,500,000 Rupees worth of gemstones are produced annually. The principal varieties are the ruby, sapphire and its star varieties, cat's eye, zircon, topaz, aquamarine, and moonstone.

The experimental plant for the recovery of monazite from beach sands continued to work throughout the year. Due to lack of machinery only No. 2 grade monazite assaying 70 percent rare earth oxides was produced. A stock pile of about 225 tons of No. 2 grade monazite awaited further treatment at year's end. An Exolon magnetic separator is on order for the plant.

## CYPRUS

The United States firm—Cyprus Mines Corporation—once again was the most important mining and metallurgical enterprise on Cyprus in 1957. While ore output from the only operating mine, Mavrovouni, was down slightly to 923,831 dry long tons from 933,685 in 1956 the company established very important gains in recovery of all mineral products excepting flotation pyrite. For details of the rapidly growing trend in mineral recovery during the last four years see the enclosed table. The company's three other leased mines Skouriotissa, Mathiati, and Appliki were not operated during the year.

### Exports of Pyrite Produced by Hellenic Mining Company Ltd. in 1954, 1955, 1956, and 1957 in Tons

Country	1954	1955	1956	1957
Western Germany	140,818	148,761	202,534	223,278
United Kingdom	38,849	43,249	—	—
Holland	34,109	38,962	47,735	2,200
Switzerland	3,376	10,206	—	—
Italy	—	23,448	44,591	72,645
France	—	5,659	3,937	—
Czechoslovakia	—	—	—	14,179
Totals	217,152	270,285	298,797	312,302

The Hellenic Mining Company Limited holds a total of 42.55 sq. miles of mining leases, in the areas of Kalavassos-Asgata, Mitsero-Agrikopia, and Kambia-Sha; and 32 prospecting permits in various parts of the Island. Development of important pyritic ore bodies has continued in the Mitsero-Agrikopia mining lease area, where an overburden of over 1,500,000 tons was removed in open pit operations. An updated pyrite benefic和平 plant, in the same area, commenced operation early in the year. Development in the Kambia-Sha mining lease area involved the removal of over 2,150,000 tons of overburden. Plans have also been completed and work is in hand for the erection of a second loading installation, on the North coast, besides the existing one at Vassilikou, on the South coast. The average number of men employed during the year was 1,306 and production of pyrites amounted to 305,955 tons against 299,857 tons during 1956.

### Mineral Production of Cyprus Mines Corporation in 1954, 1955, 1956, and 1957

Commodity	1954	1955	1956	1957
Copper	73,289	86,351	101,689	112,434
concentrates <sup>b</sup>	2,314	3,225	3,094	3,431
Cement copper <sup>c</sup>	75,614	100,003	142,732	176,255
Cuprous pyrites <sup>d</sup>	6,302	6,467	7,163	8,111
Gold in copper concentrate <sup>e</sup>	60,890	62,381	69,988	85,886
Flotation pyrite <sup>f</sup>	452,805	500,778	587,723	529,871

1. Dry long tons. 2. Fine ounces.

The Cyprus Asbestos Mines Ltd. has a lease over practically all the asbestos bearing areas in Cyprus. Mining operations were as usual carried out during the dry season, which is reported to have been unusually short in 1957. A total of 1,421,703 tons of rock was quarried against a total of 1,210,000 tons during the 1956 season. Recovery of marketable asbestos fiber amounted to 15,028 short tons against 15,400 short tons in 1956.

The Cyprus Sulphur And Copper Company Ltd. reports that during the year 38,376 tons of pyritic ore were mined from Kinoussa mine in addition to 39,326 tons mined from the Kinoussa open pit mine. Kinoussa mine will be closing down early in 1958 as the main part of the economic grade of ore had

### Exports of Minerals From Cyprus in Long Tons For 1956 and 1957

Mineral	1956	1957
Iron pyrite	821,727	762,501
Cuprous pyrite	64,455	226,334
Cuprous concentrate	119,211	139,192
Cement copper	3,700	3,900
Chromium ore	5,826	5,070
Asbestos	12,505	11,886
Gypsum rock	25,424	41,687
Gypsum calcined	3,023	1,257
Umbers	4,748	4,317

already been mined by the end of December, 1957. Exports during 1957 amounted to 54,482 tons of cuprous pyrite and 9,660 tons of flotation pyrite.

The Cyprus Chrome Company Ltd., of Ayios Nicolaos continued operating the chrome ore mine on Troodos. A total of about 1,600 tons of concentrate was produced. Exports during the year amounted to 5,070 tons of ore and concentrates.

Mr. M. W. Berdy of Larnaca operated the Troulli mine and produced 832 tons of copper concentrate of which 777 tons were exported during the year.

## HONG KONG

During 1957 the most active mining in Hong Kong was at the magnetite iron ore mine at Ma On Shan. A monthly average of 8,000 tons was shipped, mainly to Japan. A wet magnetic plant beneficiates the ore to 60 percent grade. During the year considerable damage was done to the mine by typhoon and as a result production was slowed. Open pit mining has been suspended and underground mining started. There are four levels extending into the ore body. With the changeover from open pit to underground mining the number of miners was reduced; there are now less than 1,000.

The low price of tungsten brought to a halt almost all mining of wolframite. Only 36 tons production was reported. Normally the largest production of wolframite comes from underground mining with only a small amount from alluvial and placer deposits in the stream beds and paddy fields. Altogether there are 17 workings that can be classified as mines: Two as major workings (Needle Hill and Lin Fa Shan) which use some mechanical equipment; and 15 as minor workings.

The production of lead ore during the year from the Lin Ma Hang mine was very low; only 129 tons. This is high grade ore that was cobbled by hand. In the Lam Tsuen Valley where the Mountain Lead Company have a considerable prospecting area no work was done.

The graphite deposit on West Brothers Island was worked continuously throughout the year. An average of 300 tons a month was exported, mainly to Europe. The quality of this graphite is generally high.

During the year the Department of Mines continued to administrate and control mining. Amendments to the local Mine Ordinance were made. The University of Hong Kong in its Department of Geology has over the past few years installed equipment and apparatus for research work, mainly in the field of mineralogy. A close liaison exists between it and the Government Mines Department.

## INDIA

As in the past, iron and steel production occupied much of the country's attention during 1957. Seven major steel companies in Japan made an agreement with the Indian State Trading Corporation for the import of 7,200,000 tons of Indian iron ore over a five-year period. Total exports of iron ore in 1957 amounted to 1,214,237 tons valued at Rupees 66,200,000. Of this output, Japan received 582,465 tons; Poland, 173,914; Italy, 126,310; Yugoslavia, 114,465; Czechoslovakia, 112,904; Germany, 87,-

### Production of Minerals in Israel From 1953 to 1957<sup>1</sup>

Commodity	1953	1954	1955	1956	1957 <sup>2</sup>
Phosphate rock <sup>3</sup>	23,092	58,195	71,779	115,572	150,000
Potash <sup>2</sup>	4,426	18,343	15,555	45,398	78,000
Ball and fire clay <sup>2</sup>	5,001	8,381	6,415	7,324	8,400
Cement <sup>2</sup>	464,735	563,099	633,538	612,872	700,000
Salt <sup>2</sup>	79,993	26,636	20,290	25,972	30,000
Quartz sand <sup>2</sup>	12,026	11,541	12,583	15,722	16,500
Gypsum <sup>3</sup>	22,250	30,200	50,000	50,000	65,000

1. Metric tons. 2. From Statistical Bulletin of Israel. 3. Estimated.

610; and the remainder of 16,569 tons went to the United States, the United Kingdom, and The Netherlands.

A final contract was signed with the Indian Steelworks Construction Company of London during the year. This plant will go into initial production in 1959 at a cost of about Rupees 138 crores. Construction of two other steel plants continued during the year: the Rourkela plant financed by German industrialists and the Russian designed plant at Bhilai. Meanwhile, a \$130,000,000 plant expansion was on schedule at Jamshedpur where Kaiser Engineers Division of Henry J. Kaiser Company is undertaking the work for Tata Iron and Steel Company. Production will be increased from about 1,300,000 to 2,000,000 ingot long tons annually.

During the year, it was announced that three up-grading plants would be erected for the improvement of the quality of low-grade manganese ore. The project will be a joint venture of public and private enterprise. Content is expected to be increased from the present 30 to 38 percent Mn to 46 to 48 percent Mn. One plant will be in Belgaum, another in Vidarba, and a third in the Panchmahal area. During the first quarter of 1957, India produced 430,000 tons of manganese ore. This was an increase over output of October-December 1956, but compared with the corresponding quarter of 1956, it showed a drop of 69,000 tons. Further figures have not been received.

The Indian Atomic Energy Department reported location of a 3,300,000-ton ore deposit in northeast India, said to contain 300,000 tons of thorium, and 10,000 tons of uranium, and about 80,000,000 tons of ilmenite.

## ISRAEL

Mineral development in Israel attained new heights during 1957. Most significant was the completion of the copper cementation plant at Timna. New production records in phosphate and potash were achieved and exploration of highly refractory flint clay deposits was initiated.

As the year ended, Israel Mining Industries, Ltd., neared completion of the copper cementation plant at Timna, situated some 15 miles north of the Red Sea Port of Eilat. The plant is designed to treat 1,500 tons of copper ore per day, averaging 1.5 percent Cu. First copper

production is expected by summer of 1958. A substantial part of the equipment was obtained from German sources, under the West German-Israel Reparations Agreement. Mining of copper ore commenced late in 1957 from the open pit mine situated on the outcrop of the sedimentary ore body and development of an underground mine is to start in 1958. A drilling program was commenced in 1957 to prove up additional ore reserves, and will be continued in 1958. It is indicated that 50,000,000 tons, in addition to the already proven 12,000,000 tons, may be available.

Output of beneficiated phosphate rock advanced from 115,572 tons in 1956 to 150,000 tons in 1957. Ore averages 24 percent P<sub>2</sub>O<sub>5</sub> and is upgraded to 28.5 by air separation at the mine site at Oron, in the Negev desert. The Negev Phosphate Company Ltd., operators of the mine, continued their studies to improve recovery and quality of the product.

The beneficiated rock is shipped to Haifa, where it is processed into superphosphate by Fertilizers & Chemicals, Ltd., largely for local consumption. Export of beneficiated phosphate rock and superphosphate increased considerably during 1957.

Production of muriate of potash by the Dead Sea Works, Ltd., at Sdom, at the south end of the Dead Sea, was 78,000 tons as compared to 45,000 tons in 1956. Most of the product is exported.

## JAPAN

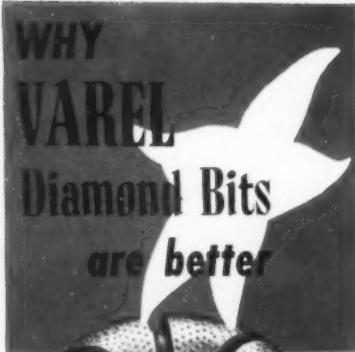
Japan's mining and metallurgical industries started 1957 with plans for high output from local mines plus imported scrap, concentrates, and ores. In May, however, the Japanese government took emergency measures to recover the balance in foreign exchange and curtailed funds available for imports.

Monthly production of copper, lead, zinc, nickel, pyrite, etc. was at a high level during the early part of the Japanese fiscal year (April 1, 1957 to May 31, 1958). With the decline in foreign markets starting in August the metallurgical industry reduced output. Despite this curtailment in late 1957 electrolytic copper output hit a new peak and domestic copper concentrate production increased over 1956. Copper smelting and refining was reduced 15 percent at nine plants in October.

### Production of Metals and Ores in Hong Kong for the Years 1949 Through 1957

Commodity	1949	1950	1951	1952	1953	1954	1955	1956	1957 <sup>4</sup>
Iron ore <sup>3</sup>	59,181	169,374	160,684	127,512	123,200	90,800	115,000*	122,963*	94,182*
Tungsten conc. <sup>2</sup>	—	—	44,149	217,599	313,721	60,335	51,548	53,500	36,19
Tin ore <sup>2</sup>	800	1,000	2,514	1,188	156	—	—	—	—
Molybdenum <sup>2</sup>	—	—	250	737	3,327	193	52	—	—
Lead <sup>2</sup>	—	—	176	752	645	368	384	198,65	129,61
Graphite <sup>2</sup>	—	—	—	—	200	1,840	1,535	2,442	3,305
Kaolin and Clays <sup>2</sup>	—	—	620	4,381	5,934	6,063	5,342	5,463	6,961

1. Metric tons. 2. Pounds. 3. Concentrate. 4. Long tons.



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## Asia

### Production of Metals and Ore in Japan in 1951, 1952, 1953, 1954, 1955, 1956, and 1957<sup>1</sup>

Commodity	1951	1952	1953	1954	1955	1956	1957 <sup>2</sup>
Copper (electrolytic) <sup>3</sup>	40,866	94,385	91,065	106,478	113,316	126,156	142,171
Lead (electrolytic) <sup>3</sup>	11,116	19,148	23,145	34,114	37,126	46,307	54,042
Zinc (electrolytic) <sup>3</sup>	33,246	49,341	54,827	68,108	72,678	136,226 <sup>4</sup>	138,022 <sup>5</sup>
Zinc (distilled) <sup>2</sup>	15,101	20,680	23,578	32,732	38,875		
Mercury <sup>2</sup>	80.0	110.0	220	148.7 <sup>6</sup>	172	287	409
Antimony <sup>2</sup>	221.2	543	1,197	264.4 <sup>9</sup>	301.9 <sup>6</sup>	56.2 <sup>6</sup>	429 <sup>9</sup>
Tin (electrolytic) <sup>2</sup>	433.4	786	858	889	1,002	1,185	1,281
Pyrite (ore) <sup>2</sup>	2,162,344	2,567,053	2,296,389	2,677,847	2,736,143	3,097,407	3,369,029
Silver <sup>2</sup>	143,320	185,722	249,210	237,342	227,400	191,814	202,987
Gold <sup>2</sup>	176,900	209,210	235,890	9,374,147 <sup>6</sup>	7,487,600	7,509,055	7,816,456
Titanium sponge <sup>2</sup>			51,902	515,114	1,249,787	2,524,681	2,337,298
Aluminum <sup>2</sup>				53,111	57,315	63,997	67,980
Nickel <sup>2</sup>						5,664	7,252
Germanium <sup>2</sup>						102,711	399,274
Sulphur <sup>2</sup>						202,879	247,264
							257,568

1. Preliminary. 2. Metric tons. 3. Kilograms. 4. Fine ounces. 5. Grams. 6. Content of ore. 7. Total zinc slab output.

Lead and zinc production was maintained at a high level. In fact domestic mine production of lead was increased to 35,864 tons in 1957 from 29,524 tons in 1956. Electrolytic lead output was 54,042 metric tons against 46,362 tons in 1956. In line with the increased production at the existing refineries, Kunimori refinery in Hokkaido of Sumitomo Metal Mining Co. Ltd. started refining operation with the actual production of about 300 tons of electrolytic lead per month after October. Zinc concentrate production in 1957 was 135,463 metric tons, 12 percent higher than production of 123,001 tons in 1956.

Mitsui Mining & Smelting Co., Ltd. expanded the capacity of its Hibi copper smelter from 1,100 to 1,500 metric tons per month to meet the capacity of the Takehara refinery. These expansions had been projected by the company to process increased supplies from Sipalay and Bagacay mines in The Philippines.

Dowa Mining Co., Ltd. installed a 100 ton per day sulphuric acid plant at the Kosaka refinery when it increased capacity of zinc production to 600 metric tons per month from 240. Apart from this, the company confirmed a reserve of iron pyrite amounting to 18,000,000 metric tons (S 5 percent, Fe 46 percent) at the Yanahara mine in Okayama, Ken. The milling capacity was raised to 60,000 tons per month from 53,000.

Mitsubishi Metal Mining Co., Ltd. expanded the electrolytic capacity at the Osaka copper refinery to 2,800 tons per month from 1,800 in order to meet the expansion of the Naoshima smelter where smelting capacity was raised to 3,000 tons per month from 2,000. In line with the increased smelting capacity at Naoshima the company installed a sulphuric acid plant which recovers 5,400 tons of 50% sulphuric acid and 5,800 tons of 98 percent acid per month.

Nippon Mining Co., Ltd. completed a pyrrhotite mill at the Kawayama mine with an initial capacity of 2,500 metric tons per month which can be enlarged to 7,500 tons capacity. In connection with expansion of the Kawayama mine the Iwakuni mill to treat Kawayama's ore was completed. Output is 175 tons copper concentrate, 260 tons zinc concentrate, and 3,570 tons iron pyrite per month from 7,500 tons milled per month.

Mikkaichi Smelting Co., Ltd. having connection with Nippon Mining Co. Ltd., installed a plant to recover Au-Ag-Cu contained in zinc slag. This plant has a capacity for recovering 180 tons of material containing Au, Ag, and Cu by treating 530 tons per month of zinc slag.

Sumitomo Metal Mining Co. Ltd. purchased the idle copper mines of Hakko

and Hamae (both located in Tohoku district) which were under prospecting operation. In September the company discovered a deposit of about 300,000 metric tons containing 1.5 percent Cu.

## REPUBLIC OF KOREA

Production of scheelite, amorphous graphite, gold, and iron ore which are Republic of Korea's chief mineral products increased in 1957. The tungsten concentrates output was up slightly to 3,825 metric tons from 3,741 in 1956. This was a high output considering that only six mines were in operation at year's end contrasted with 120 in 1953 when the all time high of 7,456 tons were produced. By early 1958 there were only three mines in continuous operation with drastically curtailed output. They are the Sang Dong scheelite mine and the Dal Sung wolframite mine of the Korea Tungsten Mining Company, and the Ok Bank mine which produces a very high grade scheelite concentrate from pure and high grade ores.

Construction proceeded on schedule for the new synthetic scheelite plant of Korea Tungsten at the Sang Dong mine with completion set by June 1958. The digester building, the precipitation building, and the boiler plant were completed. Utah Construction Company serves as engineering consultant and it is anticipated will continue as operational adviser after the plant is completed.

To meet increasing demands for amorphous graphite production was increased 241 percent over 1956. Graphite was used by local foundries and an increase in exports, especially to Japan, was made.

Output at the Yang-Yang iron mine increased and it is scheduled to reach the 200,000 metric tons per year goal in the near future. Reserves are estimated at only 2,000,000 tons so airborne prospecting and diamond drilling, to increase reserves, are scheduled for 1958 under the International Cooperative Administration.

The Chang Hang copper smelter project of the United Nations Korea Reconstruction Agency was started during the year and is scheduled to be completed in June 1958 at a cost of \$1,460,000. In 1956 an embargo was placed on copper concentrate exports so that the smelter would have a supply to smelt.

Gold output, largely placer, increased during 1957 and was due to test operations of the 6.5 foot connected bucket line dredge at the Dae-Chon mine.

Joint exploration by United States and Korean engineers was carried on at

# Asia

## Production of Ores and Metals In the Republic of Korea For 1952, 1953, 1954, 1955, 1956, and 1957

Commodity	1952	1953	1954	1955	1956	1957
Gold <sup>1</sup>	18,636	16,100	52,250	45,654	47,200	64,400
Silver <sup>1</sup>	—	52,500	50,200	69,767	195,800	276,000
Copper ore <sup>2</sup>	9,819	10,144	7,047	13,040	14,766	9,168
Electrolytic copper	348	199 <sup>3</sup>	204,725 <sup>3</sup>	328,930 <sup>3</sup>	907,288	792,535
Lead ore <sup>2</sup>	366	260	116	1,362	2,931	1,843
Bismuth conc. <sup>2</sup>	279	638	382	407	608	563
Bismuth metal <sup>2</sup>	17	299	160	115	172	149
Iron ore <sup>2, 4</sup>	20,577	18,831	30,996	29,135	62,867	185,412
Manganese ore <sup>2, 5</sup>	7,416	3,270	1,691	3,450	1,958	3,205
Nickel ore <sup>2, 6</sup>	1,060	1,126	140	—	500	225
Tin conc. <sup>2</sup>	3,790	7,456	3,828	2,920	3,741	3,875
Molybdenum conc. <sup>2</sup>	11	19	19	22	25	27
Crystalline graphite <sup>2</sup>	254	683	713	—	528	260
Amorphous graphite <sup>2</sup>	14,806	18,744	13,200	87,900	60,588	147,341
Asbestos <sup>2</sup>	—	—	211	60	49	87
Talc <sup>2</sup>	3,764	9,483	8,326	6,240	6,297	6,600
Kaolin <sup>2</sup>	1,766	8,723	9,457	13,462	9,387	6,622
Pyrophyllite <sup>2</sup>	9,830	14,281	10,693	2,688	7,963	4,680
Fluorite <sup>2</sup>	(80% CaF <sub>2</sub> )	5,553	9,802	8,872	10,073	3,113
Monazite <sup>2</sup>	85	707	1,005	508	183	355
Barite conc. <sup>3</sup>	(98% Ba)	918	305	846	675	7
Zinc ore	—	—	—	—	831	564
Pyrite	—	—	—	—	46	550
Zircon	—	—	—	—	0.44	8.45

1. Fine ounces. 2. Metric tons. 3. Kilograms. 4. 50 percent iron. 5. 40 percent Mn. 6. 3 percent Ni. 7. 40 percent sulphur.

Korea's only tin deposit during the year. The deposit, a pegmatite, in Young-wol, Kang-won Province is estimated to contain 600,000 tons of 2.3 percent tin. Prospecting is scheduled for 1958 with International Cooperation Administration funds. Small production was made by a few miners using hand methods.

In 1957 the Korean government transferred ownership of 92 mines to private groups. A total of 312 mines are to be transferred, but lack of investment capital slowed the transactions.

## MALAYA

The Federation of Malaya achieved independence on August 31, 1957 within the British Commonwealth; it is unlikely that changes unfavorable to foreign mining interests will be introduced, since approximately 85 percent of the country's total export earnings are derived from tin and rubber.

Of the various minerals mined tin is the most important, inasmuch as Malaya's share of the market covered by the International Tin Agreement is the largest, the allocation for the period December 15, 1957 to March 31, 1958 being 37.5 percent of the total permissible exports amounting to 27,000 tons.

In view of the fact that exports are limited by these restrictions lower output figures must be expected during 1958. This trend became apparent in 1957 when production was 59,293 tons as against the post-war record of 62,295 achieved in 1956. This state of affairs was also reflected in the fall of tin producing units from 784 in 1956 to 738 in 1957.

Export controls called for by the International Tin Council are not, however, the only factor affecting future production. Consideration is being given to the granting of more prospecting and mining leases. An aerial-magnetic survey completed in 1957 under the auspices of the Colombo Plant has reinforced the validity of the statement made by the recently retired chief inspector of Mines of the Federation of Malayan Government to the effect that: "There is as much tin left in the ground in Malaya as has ever been taken out in the past."

The Eastern Mining and Metals Company operated its open-pit iron mine in

## Production of Metals and Minerals in Long Tons in Malaya in 1954, 1955, 1956, and 1957

Commodity	1954	1955	1956	1957
Tin	60,690	61,244	62,294	59,293
Coal	224,540	206,118	182,479	152,711
Iron ore	1,212,780	1,466,184	2,444,570	2,972,359
Ilmenite	44,745	53,875	122,176	91,734
Monazite	—	249	631	390
Tungsten	99	106	91	50
Golumite	111	236	276	142
Bauxite	165,621	222,162	264,444	325,629
Gold <sup>1</sup>	20,995	22,838	20,252	11,157
China clay	1,352	1,378	1,155	752 <sup>2</sup>

1. Troy ounces 2. First six months 1957

Trengganu which produced 25 percent of the iron ore imported by Japan. The 1957 production was about 21 percent higher than in 1956. Ilmenite output was about 25 percent lower than in 1956.

The rate of expansion in bauxite mining was stepped-up compared with 1956. 1957 production was 23 percent higher.

Gold production fell by about one half because of a labor dispute which started towards the end of 1956 and lasted six months. As a result the mine became partly flooded making it impossible to resume normal operations for a period of about one year.

As indicated in last year's review, prospecting for uranium was undertaken and a report on a joint Canadian-Malayan aero-magnetic and radioactivity survey is in the final stages of preparation and will be available during 1958.

## Number of Active Tin Producing Units in Malaya, end of December 1956, and 1957

Units	1956		1957	
	European	Asian	European	Asian
Dredges	78	0	76	0
Gravel pumping	20	613	19	578
Hydraulic	11	2	8	2
Open cast	2	3	2	2
Underground	1	23	2	23
Small workings <sup>3</sup>	1	28	0	26
TOTALS	113	671	107	631

1. Without machinery.

## TAIWAN

Mine production of sulphur and coal in Taiwan in 1957 were the highest on

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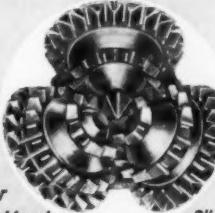
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## Waste Disposal by Tautline-Scraper

A Foote Mineral Company plant is using the Sauerman Method to solve a difficult sludge removal problem. A 2-yd. Tautline-DragScraper has proved to be ideal for the job. The sludge is handled safely and efficiently—men or machines need not travel on the material, since only the DragScraper and cables enter the disposal area.

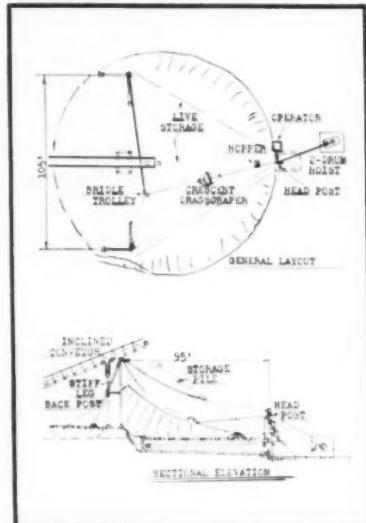
The DragScraper distributes the sludge from the discharge point to a natural valley about a thousand feet long by several hundred feet wide. It is connected to a 2-wheeled plate carrier which runs on a track cable between the headpost and one of the tail masts. The operating cables permit the DragScraper to be hoisted free of the material—a great advantage over conventional hauling methods. A Sauerman 3-drum hoist provides DragScraper power.

(Condensed from *Sauerman News No. 148*.)



**Reclaiming Material** to hopper from all sections of a 500-ft. warehouse, the estimated operating cost of this DragScraper Machine is 2.1 cents per ton. (*Sauerman News 145*.)

## Rapid Shifting DragScraper is Engineered to Needs of Silica Sand Producer



The Sauerman Method was successfully applied to the requirements of a prominent silica sand producer, as shown in the drawing above. This Rapid-Shifting DragScraper Machine reclaims raw sand from a 6,000-ton stockpile.

The pile is formed by an inclined conveyor leading from the floor of the quarry to the live storage area. The Crescent DragScraper reclaims from storage to a hopper-fed conveyor in front of the head post.

Before the DragScraper was installed, the raw sand frequently bridged across the hopper. Such interruptions in the flow of raw sand to the plant resulted in costly shutdowns. The Crescent prevents this bridging action and provides a steady flow of material for processing.

The Sauerman Method also permits the company to build up a reserve pile of raw sand sufficient for at least one week's production as insurance against a quarry shutdown.

(Condensed from *Sauerman News No. 147*.)

### MORE NEWS AND INFORMATION

Issues of *Sauerman News* giving greater detail about the installations on this page are available on request. For full information, tell us your interest or requirements and ask for catalog. Contact Sauerman Bros., Inc., 638 S. 28th Ave., Bellwood, Ill.

## Asia

record. Silver, copper, and iron output increased over 1956. Plans for 1958 call for increased production of coal, gold, copper, and industrial minerals largely used for building.

Sulphur production in 1957 increased to 9,700 metric tons, an increase of 1,300 metric tons over the previous year. This breaks all previous records in the sulphur industry of Taiwan. Pyrite output of 34,000 metric tons in 1957 is 12 percent above that in the previous year. The production of both sulphur and pyrite failed to reach the anticipated figure for 1957 by a slim margin due to the reconstruction of one of the main highways leading to the sulphur mining districts. Production will be increased in 1958 when this highway is completed. Electrical geophysical prospecting was applied to explore for the pyritic zones in the volcanic regions in northern Taiwan and some new mineral localities were found for future development.

More vein gold and placer gold localities were explored in the Central Range of Taiwan. Further development will be made pending the completion of the cross-island highway which penetrates deep into the higher parts of the Range. Rich copper-bearing auriferous veins were found in the Chinkuashih mine in northern Taiwan, an increase of 300,000 to 500,000 metric tons of ore reserve being achieved.

### Production of Minerals in Taiwan in 1954, 1955, 1956, and 1957

Commodity	1954	1955	1956	1957
Coal <sup>1</sup>	2,100,000	2,359,316	2,529,046	2,916,084
Gold <sup>2</sup>	763,000	874,399	1,166,400	606,000
Silver <sup>2</sup>	960,000	1,988,587	1,575,400	2,024,600
Copper <sup>2</sup>	950	1,174	1,701	1,901
Sulphur	6,052	4,932	8,491	9,754
Pyrite <sup>2</sup>	24,860	29,019	28,666	33,466
Graphite <sup>2</sup>	700	695	2,073	2,500 <sup>3</sup>
Talc <sup>2</sup>	5,600	5,268	6,131	7,000 <sup>3</sup>
Asbestos <sup>2</sup>	69	366	101	100 <sup>3</sup>
Porcelain clay <sup>2</sup>	—	470	3,553	4,000 <sup>3</sup>

1. Metric tons. 2. Grams. 3. Estimated.

## THAILAND

Lower metal prices were the main cause of the mining industry's recession in Thailand in 1957. The closure of tungsten mines was averted by the reduction of the tungsten royalty rate. Tin is the only important metal produced in Thailand, although the tin mining industry was still heavily taxed by an unreasonably high royalty rate caused by inflation of the local currency.

Tin production in 1957 is estimated at 13,300 long tons of metallic tin—an increase of over 1,000 tons over 1956 output.

The operations of the Aokam Tin Ltd.'s revolutionary deep-sea dredge at Bhuket were carried out throughout the year with unexpectedly good results. The construction of another deep-sea dredge of a more conventional design was commenced by Tongkah Harbour Tin Dredging Ltd.

Tromal Prospecting Company also drilled several areas in the sea near Bhuket. Development works continued at the hard rock Chon mine near Takuapa while operations at the Labu mine in Yala were stopped.

Although international tin export restriction was enforced on December 15th 1957, the government did not allocate

## Asia

new export quotas for tin producers until the middle of January 1958.

Unlike other tin producing countries, export quotas in Thailand were not based on producing capacities of the mines, as most dredges, regardless of size, were given the same export quotas.

### Production of Minerals and Metals in Thailand in 1954, 1955, 1956, and 1957

Commodity	1954	1955	1956	1957
Tin <sup>1</sup>	9,776	11,108	12,481	13,300*
Tungsten <sup>2</sup>	1,085	1,126	1,500	800
Antimony <sup>3</sup>	1,390	48	20	N. A.
Lead <sup>4</sup>	N. A.	12,512	8,000	N. A.

\* Estimated. 1. Long tons metallic tin. 2. Long tons of concentrate. 3. Metric tons of concentrate. N. A. Not available.

## TURKEY

Prospecting and exploration were the highlights of Turkish mining in 1957. Production generally was lower than in 1956. Geological and geophysical surveys continued for scheelite, chromite, and lignite. Increased production of iron ore was necessary to supply the expanding steel industry.

Chromite production from both the government (Etibank) and private mines decreased. This was accelerated toward year's end as price and markets fell off. Production figures are available only through August. In 1957 182,988 tons from Etibank; 193,016 in same period of 1956. Plans were completed for retreating chromite tailings and plans were being made at year's end to conduct geophysical surveys. Increased development of deposits in the eastern provinces is scheduled as they are considered most promising for the future. Deep exploration in those provinces and in the Iskenderun district was begun. The Kavak mine is to have a new shaft 400 meters deep.

The German firm of Krupp served as an iron and steel consultant for the Turkish government during 1957. Drilling for iron ore near Edremit was under way. The steel plant at Karabuk is to be enlarged by a German firm. The new iron ore mine near Simav in western Turkey was brought into production at a daily rate of 100 tons during the year. Ore output through August was 335,737 tons, an increase from 295,546 in same period of 1956.

Copper production for first eight months increased to 16,396 tons compared with 15,871 in the same 1956 period. However, the Ergani mine of Eti Bank closed in July so copper output for full year was down. Eti Bank conducted geophysical surveys in the Ergani area.

Newmont Mining Corporation discontinued its lead exploration at the old Balya lead mine during the year. Also terminated was the work of Turk Molibden Sirketi which had been organized to work the Gelenic deposit near Gelenic.

During the year prospecting for scheelite by private parties was closed in the Province of Bursa. However, MTA geologists prospected extensively with reported negative results. The large deposit at Uludag was scheduled to be brought into production by joint Turkish-West German interests but at year's end no work had been completed.

MTA made an important discovery of an estimated 7,000,000 tons of borax (colemanite) near Kuthaya early in the year while prospecting for lignite.

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# EUROPE

## AUSTRIA

The general situation in Austria's mining industry was more or less encouraging in 1957. Most mining operations increased production, especially the more important ones such as iron and magnesite. The latter added considerably to the nation's income.

Despite higher production figures than in the previous year, however, lead-zinc and copper suffered heavily from the tremendous price drop on the world market. Neither of these metals has ever been very profitable for Austria because of low-grade ores and comparatively small scale mining and processing operations.

Iron ore production for 1957 was 7.3 percent higher in 1956, and 23 percent higher than in 1955. This considerable increase in ore output was mainly due to investments (World Bank credit) and improvements in production methods. Low-grade ore is being treated in a new sink-float plant with a capacity of 400 tons per hour at Alpine Montan-Gesellschaft's Erzberg mine. A second smaller one is also in operation. Mild weather was extremely helpful since there is only open-pit mining there. Average daily production was 42,130 tons.

Steel production increased 20 percent to 2,504,000 tons, as compared with 1956. During 1957 this consisted of 338,000 tons of electric steel, 966,000 tons of Siemens Martin steel, and 1,200,000 tons of oxygen steel. These figures show a rate increase for the oxygen process of 41 percent over 1956. Within the last few years this new technique has obviously become the most important method of raw steel production in Austria.

Magnesite mining again moved upward. It was 8.2 percent above the 1956 figure and 16 percent above 1955. Magnesite is one of Austria's more profitable mining industries. Value of 1957 exports of magnesite and magnesite stones amounted to \$275,500,000.

Graphite, kaolin, and talc were also among the principal exports from the mining industry in 1957. The aluminum production shown on the table came largely from imported alumina as Austrian bauxite was not suitable for production.

### Austrian Production of Metals and Minerals In Metric Tons In 1955, 1956, and 1957

Commodity	1955	1956	1957
Iron ore, total	2,838,450	3,257,887	3,495,721
Lead-zinc ore	176,519	163,119	182,845
Copper ore	158,639	152,826	165,177
Antimony ore	10,978	10,356	11,023
Bauxite	19,138	22,093	22,325
Gypsum + anhydrite	412,017	452,834	525,636
Graphite	17,814	18,685	18,921
Magnesite	991,709	1,083,635	1,172,598
Talcum	70,524	66,055	73,405
Kaolin	260,316	272,364	292,248
Lead, conc.	6,625	6,567	7,467
Copper, conc.	9,307	8,337	8,461
Aluminum	50,000	70,700	72,800

## ERIE

In spite of the Income Tax Concessions granted by the Irish government to new mining enterprises, 1957 proved a disappointing year both in the development of new base metal mining properties and in the production from the operating ones.

St. Patrick's Copper Mines Limited, the wholly owned subsidiary of Irish Copper Mines Limited of Toronto, Canada, was unfavorably influenced in its production program by the fall in world copper prices and delays were experienced in the installation of the treatment plant. Underground development was maintained and commencement of production is expected late in 1958, at a rate of 4,000 tons per day of copper ore said to assay about 1.00 percent.

Explorers Alliance of Canada carried out a geophysical survey and diamond drilling of the old Bunmahon copper mines in County Waterford. Results were not sufficiently encouraging to warrant continuing exploration and the project was abandoned.

At the Glendalough lead and zinc mines in County Wicklow, Explorers Alliance through its subsidiary, St. Kevin's Lead & Zinc Mines Limited, carried out extensive underground development and exploration. Values encountered did not justify continuing work at the reduced prices for lead and zinc and the mine was closed.

A copper prospect at Hollyford, County Tipperary, which was diamond drilled was also abandoned during the year.

The Emerald Isle Mining Company, a subsidiary of the Can-Erin Mining Company, continued its examination of the Allihies copper mine in County Cork. As the dewatering of the extensive old workings has progressed, it is reported that underground surveys have indicated an improvement in the grade of ore in depth. A bulk sample of the ore has been sent to the United States for testing purposes.

The Abbeytown Mining Company Limited, operating in County Sligo, maintained production of lead and zinc flotation concentrates.

The Silvermines Lead & Zinc Company Limited continued production of lead flotation concentrates from the Shellee lead mine and crude barite from Ballynoe. The chairman reported that the directors of the Silvermines Lead & Zinc Company had received proposals from Cyprus Mines Corporation and Cerro De Pasco Corporation for the exploration of, and option to mine, the areas other than Shellee, over which the Company holds mining rights. Negotiations concerning these proposals are reported to be still in progress.

Because of the reduced metal prices, there was a decrease in production of lead and zinc concentrates during the latter months of 1957. Production of 70 percent Pb concentrates amounted to 2,900 tons, and 55 percent Zn concentrates amounted to 2,850 tons.

Gypsum Industries Limited at Kingscourt, County Cavan, maintained production of gypsum at approximately 133,000 tons for the year.

There was an increase in crude barite production over 1956 but figures are not yet available.

## FINLAND

Production records in the Finnish mining industry continued to rise during 1957. Although no new mines reached the production stage, figures for the existing ones showed a substantial gain.

The Outokumpu Company continued the operation of its four mines at Outokumpu, Vihanti, Ajala, and Vlojärvi. In addition, the company has undertaken the opening of a new mine at Leppävirta. Operation at this property will begin in 1959. Copper and nickel will be the two major metals to be recovered.

The vanadium plant of the Otanmäki Company was operating for its first full year at one half of its rated capacity. During 1957, the second series of pelletizing equipment, the second large furnace, and the necessary additional leaching apparatus were installed to bring the capacity up to the 1,000 tons of V<sub>2</sub>O<sub>5</sub> per annum as planned. This equipment is now undergoing full-scale tests.

Otanmäki Company has purchased a magnetite ore body at Kärväsaara in northern Finland. Operation will be started during summer 1958.

Development of the two undersea magnetite iron ore deposits was continued by Vuoksenminnka Company. At Nyhamn, a shaft has been sunk to a depth of 296 meters. A drift is now under way from the shaft to the ore. At Jussarö, shaft sinking continues. This mine will become by far the biggest mine in Finland.

Three iron ore deposits have been located by Suomen Malmi Oy at Kolari in northern Finland near the well known Swedish iron fields. Although surveying has been only preliminary, some 50,000,000 tons of ore has been verified. It is possible that the deposits are much larger. The ore carries 30 to 40 percent iron as magnetite and hematite. The nearest railway terminal now is 90 kilometers and the nearest port Tornio 200 kilometers away.

### Mine Production in Terms of Ores Milled, Minerals, and Metals Recovered by Finnish Mining Companies in Metric Tons for 1955, 1956, and 1957

Commodity	1955	1956	1957
<i>Outokumpu Company</i>			
Ore milled	1,104,702	1,221,395	1,387,668
Copper conc. <sup>1,2</sup>	104,175	100,409	122,239
Pyrite conc.	298,508	288,684	292,340
Zinc conc.	40,682	75,066	80,859
Lead conc.	1,353	2,650	4,489
Tungsten conc.	115	59	—
<i>Otanmäki Company</i>			
Ore milled <sup>3</sup>	638,958	742,399	802,244
Ore milled <sup>4</sup>	514,955	595,009	628,702
Magnetite conc.	184,474	206,168	209,783
Hematite conc.	84,974	102,915	105,749
Pyrite conc.	4,338	5,401	4,814
V <sub>2</sub> O <sub>5</sub> (100 %)	—	68.6	469.1
<i>Vuoksenminnka Company</i>			
Ore milled	115,926	120,029	108,225
Gold <sup>4</sup>	264	197	202
Copper conc.	2,085	1,576	1,915

1. Average Cu content for 1956 was 20.7 percent.

2. Average Cu in 1957 was 21.1 percent. 3. Difference between ore milled and milled is the lump waste separated in a magnetic cobbing plant.

4. Kilograms.

## FRANCE

Although the rate of individual production was somewhat slower than in previous years, French mineral output was still satisfactory and showed an average increase of about eight percent in comparison with 1956. The worldwide drop in prices of nonferrous metals had its effect upon the French market. Offsetting this somewhat, a slight increase in the price of iron ore was observed.

Bauxite production increased during the year from 1,465,000 metric tons in 1956 to 1,685,000 in 1957. Lead increased from 13,000 to 17,000 tons, while during the same period zinc ore production remained stationary at 23,000 tons.

Antimony increased from 1,800 tons to 2,000 tons. French production of asbestos, principally from Corsica, rose from 8,500 tons to 10,200 tons. A slight reduction in bismuth brought output down from 64 tons to 54 tons in 1957.

Cadmium output was up, with 170 tons in 1957, and only 108 in 1956. A great reduction took place in cobalt with production dropping from 375 tons to 264 tons. Although the d'Alberet tin mine produced 700 tons, it was closed down on December 31, 1957.

Increased activity in nickel brought 1957 output to 6,450 tons from the 1956 figure of 5,200 tons. Pyrite production increased from 305,000 tons of 324,000 tons. Fluor spar expanded from 81,000 tons to 90,000 tons. Talc rose to 141,000 tons from 132,000 in 1956.

A decrease in tungsten output was recorded with production dropping from 1,000 tons to 800 tons. Potash output remained about the same with 1,575,000 tons of K<sub>2</sub>O in 1957, compared with 1,500,000 in 1956.

The increase in iron ore production was about 7 percent, or 57,800,000 tons, compared with 53,800,000 tons in 1956. During the same period, France produced 14,000,000 tons of steel, compared with 13,400,000 in 1956, amounting to a 4.4 percent increase.

## FEDERAL REPUBLIC OF GERMANY

Mine production in the Federal Republic of Germany generally increased in 1957, except pyrite, and new post-war

Official Mine and Metallurgical Production Figures in Metric Tons for the German Democratic Republic For 1950, 1954, 1955, and 1956

Commodity	1950	1954	1955	1956
Iron ore	401,000	1,470,000	1,664,000	1,757,000
Copper ore	804,000	1,302,000	1,333,000	1,350,000
Potash salts <sup>1</sup>	1,336,000	1,463,000	1,552,000	1,556,000
Pyrites <sup>2</sup>	41,000	47,000	49,000	51,000
Pig iron	337,000	1,318,000	1,517,000	1,574,000
Steel ingots	999,000	2,331,000	2,508,000	2,740,000
Sulfur (incl. by-product)	65,526	88,366	93,493	94,236
Alumina, calcined <sup>3</sup>		41,118	46,239	54,988

1. K<sub>2</sub>O equiv. 2. S content. 3. Al<sub>2</sub>O<sub>3</sub> content.

highs were recorded for all products. The outlook for 1958 is not so good, since several mines, the most important one being the lead mine Gewerkschaft Mechemicher Werke, had to be closed because of low lead and zinc prices.

Smelter production of aluminum, lead, tin, pig iron, and steel further increased, while copper and zinc production declined. A new zinc smelter, erected by Duisburger Kupferhütte at Duisburg began production in December and will produce about 10,000 tons of electro-zinc (99.95 percent Zn) annually.

The general outlook for the non-ferrous metals industry, as well as for the iron and steel industry, is not too favorable, since demand has eased off, especially from abroad.

## GERMAN DEMOCRATIC REPUBLIC

For the first time, a few official figures have been released for mining and metallurgical production in the German Democratic Republic. These figures cover the years to 1956 only.

Of the copper ore produced in 1956, about 1,000,000 tons came from the old Mansfeld mines and about 300,000 tons were produced from the new mining field near Sangershausen. The copper content

of the Mansfeld ore is only 1.1 to 1.3 percent, compared with 2.4 to 3 percent before the war. The Sangershausen ore has higher copper contents. The total content of the copper ore produced in 1956 is estimated at 18,000 to 19,000 metric tons.

About 6,100 to 6,400 tons of lead in concentrates is produced annually. In addition, about 3,000 tons of lead is recovered from flue dusts from the Mansfeld smelters, making a total of 9,000 to 9,500 tons mine production of lead annually.

The annual production of zinc in concentrates is about 3,500 to 4,000 tons. This concentrate is reserved for the electrolytic zinc plant, being erected near Freiberg. The total reserve of concentrate is estimated at 22,000 to 25,000 tons zinc content. So far only a pilot electrolytic zinc plant with a monthly output of 150 tons is working at Freiberg. According to one report, the electrolytic zinc refinery is to start production in 1959 with an annual output of 10,000 tons. Another source says that the electrolytic refinery will not be working before 1961, but with an annual capacity of 15,000 tons.

The nickel ore reserves near St. Egidien are estimated at 40,000,000 tons averaging 0.8 to 1.0 percent Ni. Ore is to be treated by the Renn-process producing "Luppen" containing 8 to 9 percent Ni and 90 percent iron. From the "Luppen," pure nickel with 99.6 percent Ni will be produced by a further process. The direct use of the "Luppen" by the steel industry has so far been unsuccessful, because of the high phosphorus and sulfur content. The plant to be erected shall be sufficient to cover the total demand for nickel in Eastern Germany in 1962.

Furthermore, about 700 tons tin in concentrates, 200 to 250 tons tungsten concentrates, and 250 to 300 tons arsenious concentrates are also produced in Eastern Germany.

The antimony mine near Oberbohmsdorf has been idle since the beginning of 1955. Ore reserves are estimated at 1,000 tons antimony.

## GREECE

The Greek mining industry continued to make rapid strides during 1957. Modern mining in Greece dates only since 1950 when rehabilitation of plants destroyed during World War II was completed and modern prospecting and mapping was started. The mine production table shows how metal output has doubled since 1953.

Bauxite production for 1957 amounted to 800,000 metric tons. During the period 1953 to 1957 production was more than doubled. As a result of investigations recently carried out by the Greek Institute of Geology and Subsurface Research, the visible bauxite deposits have been estimated at 85,000,000 metric tons. It is

### Mine Production in the Federal Republic of Germany in Metric Tons for 1951, 1952, 1953, 1954, 1955, 1956, and 1957

Commodity	1951	1952	1953	1954	1955	1956	1957*
Lead ore <sup>1</sup>	50,700	51,700	63,000	67,700	68,100	66,300	71,900
Zinc ore <sup>1,2</sup>	101,900	106,900	116,100	120,700	120,200	121,800	126,400
Copper ore <sup>1</sup>	2,100	2,700	2,500	2,700	2,000	1,700	1,800
Pyrites <sup>2</sup>	572,038	571,300	561,727	601,460	643,300	646,900	610,000
Iron ore, crude weight	12,926,000	15,413,000	14,622,000	13,037,000	15,684,000	16,928,000	18,320,000
Iron ore, iron content	3,473,000	4,102,000	3,899,800	3,551,000	4,222,000	4,512,000	4,827,000
Potash salts crude weight	10,847,600	12,585,100	12,586,400	15,575,700	16,106,400	15,544,000	16,200,000
Potash salts, K <sub>2</sub> O content	1,323,300	1,553,700	1,577,000	1,935,600	2,019,600	1,965,400	1,986,000
Salt (rock and evaporated)	2,757,300	2,576,000	2,874,000	3,126,000	3,384,000	3,581,000	3,588,000
Graphite	10,304	8,411	7,108	9,112	10,463	11,620	—
Fluor spar	140,390	146,570	161,224	173,196	154,962	146,358	—
Barite	388,836	285,322	303,383	383,367	414,321	407,214	—
Bauxite	5,381	7,186	7,848	4,220	3,875	4,894	—
Gypsum	468,700	587,263	641,200	631,502	713,135	726,766	—
Feldspar	98,231	102,909	95,701	126,585	166,224	166,815	—
Soapstone	—	12,045	11,892	16,527	18,000	18,143	—
China clay	—	—	—	314,194	350,249	350,696	—
Fuller's earth	—	—	—	179,799	216,046	244,359	—

\* Preliminary. 1. Recoverable metal content. 2. Including recoverable zinc content of pyrite. 3. Not available.

### Smelter Production in Western Germany in Metric Tons For 1952, 1953, 1954, 1955, 1956, and 1957

Commodity	1952	1953	1954	1955	1956	1957*
Aluminum	100,474	106,940	129,219	137,066	147,362	153,838
Lead (incl. lead produced by battery manufacturers)	135,473	147,025	147,677	147,426	161,005	177,341
Copper (refined)	187,706	211,677	234,291	259,733	253,525	253,389
Zinc (excluding dust)	150,804	150,619	169,339	179,969	190,630	185,407
Tin (unalloyed)	1,442	1,574	1,355	1,420	1,727	2,081
Tin alloys	3,088	2,670	3,781	4,417	4,178	3,100
Solder	5,676	7,522	8,768	8,975	10,173	10,279
Pig iron	12,877,000	11,654,000	12,512,000	16,482,000	17,577,000	18,358,000
Steel ingots and castings	15,806,000	15,420,000	17,434,000	21,336,000	23,189,000	24,507,000

1. Estimated.

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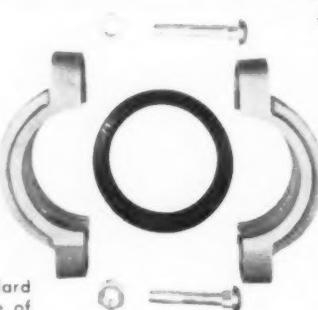
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## Europe

hoped that further investigation will prove the existence of much larger deposits.

Since 1955, a Krupp-Renn furnace has been in operation treating lateritic nickeliferous iron ore, processing 120,000 metric tons. It produces iron pellets with 4, 5 percent Ni + Co. Another plant for further processing the iron pellets to produce 20,000 to 25,000 tons of ferronickel, 8.5 to 9 percent Ni + Co, will start operating in 1958.

During the last two years, five ore dressing and flotation plants for low grade chromite, manganese, lead, zinc, etc., started operations. In the last two years, 1955-1957, new mining activities were started by American mining companies, such as Asbestos Exploration (Kennecott Copper Corporation) undertook the exploration and development of a large open pit for the production of 2,000,000 to 3,000,000 annual tons of 3 to 4 percent chrysotile ore, as well as the erection of a 40,000 to 80,000 ton mill. Already 200,000,000 tons of asbestos bearing serpentine has been proved and a large pilot plant has been operating there successfully for a year. It is estimated that Kennecott's capital investment will reach \$12,000,000.

Another American company, the Dresser Industries, Dallas, Texas is engaged in barite mining at Myconos Island, its production having reached 84,000 tons in 1957.

The Austrian firm, Oestreich-Amerikanische Magnesite Company Rodentein, in cooperation with the American firm—Basic Refractory Company in 1957 started the operation of a furnace for the preparation of 20,000 tons, per year, of dead burned magnesite from the large and high grade magnesite deposits of Greece.

Moreover, small quantities of iron ore, alluvial gold, perlite, kaolin, bentonite, and natural corundum (emery) were also produced in Greece.

The Greek government Development Program provides for the establishment of a metallurgical industry to produce aluminum metal (annually 50,000 metric tons) and pig iron (200,000 metric tons), ferrochrome, ferromanganese, and ferrosilicon. The ore deposits necessary for these industries have been located.

#### Mineral Production of Greece in Metric Tons for 1938, 1953, and 1957

Commodity	1938	1953	1957
Barite	32,997	25,459	137,239
Bauxite	147,265	330,749	820,000
Chromite	35,661	36,759	100,000
Iron ore	308,535	86,326	427,651
Nickel-iron <sup>1</sup>	—	—	125,000
Manganese	3,065	13,451	45,000
Pyrite	202,238	225,134	280,817
Lead conc.	—	6,460	14,316
Zinc conc.	12,658	11,157	23,640

1. Contains 2.0 percent Ni + Co.

## ITALY

In general, Italian mine production was larger in 1957 than in 1956. The exceptions were in iron and antimony ores.

A pyrite orebody, estimated at about 1,000,000 tons, was discovered in the Rigoloccio area of the Gavorrano mine, near Grosseto by Montecatini Company. Another, larger pyrite-magnetite deposit is still under exploration at Monte Argentario by Ferromin Company in the Grosseto district.

## Europe

In the old Vallimperina mine, near Udine (Montecatini Company), already considered almost exhausted, about 500,000 tons of additional ore were found. In the "Vigolzano" lease (Piacenza), a lens of pyrite (with 1.5 percent copper) of more than 300,000 tons was found.

In the large pyrite mines of the so-called Maremma group (Western Tuscany), several dressing plants have been improved; at Boccheggiano (Montecatini Company) the capacity of flotation plant has been doubled; a new ore dressing plant was installed at the Ravi mine; and the hydro-gravimetric ore-washing plant of Nicciola (Montecatini Company) was also improved. In the latter mine, a new ventilation shaft was also completed.

Total lead and zinc production was increased during 1957; in the last months, however, there was some decrease. At year's end, Italian lead and zinc mining industry is entering a critical position because of the expected gradual reduction of duty-protection foreseen by the Europe Common Market agreement.

In the Accesa-Serrabottini mine (Grosseto district), production was increased by the doubled capacity of the flotation plant (600 to 700 tons of ore per day). In the Argentiera mine near Belluno (Soc. Mineraria del Cadore), production began again by open pitting. Ore is treated by a new flotation plant. In the same district, underground exploration in the Salafossa zone (San Marco Company) discovered a remarkable deposit. In the Milan district, the exploitation of Zuc di Valbona mine was started with favorable forecasts.

In Sardinia a new flotation plant (70 tons per day capacity) was installed at the Mon'Ega mine; a sink and float section was installed at the Campo Pisano mine (Soc. Mineraria Sarda) to treat the pyrite-sphalerite-dolomite ore found in lower levels of the mine.

The largest portion of Italian mercury production came from the Abbadia S. Salvatore mine (Monte Amiata Company). 1957 output of this mine also increased through improvement of the mining hoisting plants and the installation of modern metallurgic (Gould) rotary furnaces. Presently two new furnaces, built in Italy, are being assembled at the mine. In the Mount Amiata area, a wide exploration program was started in 1957, and includes geophysical prospecting (gravimetric and seismic methods).

An experimental Roma furnace was installed at the Gibellini sulphur mine (Agrigento); and two Gualtieri furnaces at the Gessolungo and Pagliarello mines (Enna) in 1957. In the Bologna district the sulphur ore output remained, during 1957, the same as in 1956. A deposit of more than 400,000 tons was found in the Case Morollo area (Forlì). In the Comero mine (Strongoli e S. Nicola dell'Alto, Calabria) two four-cells Gill furnaces were renewed and a grinding plant was installed for production of the so-called "ventilated ore"; underground, cutting of a lower level outlined the existence of further ore reserves.

Intensive exploration for uranium was carried on in 1957. Particularly worth mention are the results of prospecting in the Cuneo zone (Piedmont), in Val Gardena sandstones, and in Sardinia.

Iron production slightly decreased during 1957; important innovation of last year is the renovation of the old magne-

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# Europe

**Italian Metal and Mineral Production in Metric Tons  
in 1951, 1952, 1953, 1954, 1956, and 1957**

Commodity	1951	1952	1953	1954	1956	1957
Bauxite	174,014	282,912	248,947	295,082	259,712	261,111
Antimony ore	4,537	4,478	2,343	1,973	1,537	677
Iron ore	552,855	790,237	991,294	1,065,183	1,594,769	1,565,117
Manganese ore	52,721	81,190	78,384	76,310	46,015	47,002
Mercury ore	—	—	197,498	232,055	343,588	364,717
Lead conc.	64,375	64,665	66,219	69,125	81,825	87,046
Zinc conc.	212,822	234,411	223,928	240,686	247,617	265,525
Copper conc.	—	—	1,046	4,166	2,118	1,849
Asbestos fiber	22,612	23,941	20,281	23,546	30,753	34,287
Barite	76,541	56,274	71,762	71,898	92,334	99,290
Fluorspar	41,019	59,125	75,790	77,148	124,208	144,165
Pyrite	898,186	1,141,417	1,234,566	1,231,700	1,308,591	1,469,577
Sulfur	214,340	236,439	223,061	204,040	195,208	194,340
Talc	75,996	80,336	80,282	82,372	92,852	91,766
Aluminum metal	49,751	52,830	55,463	57,572	63,409	66,500
Lead metal	36,000	34,931	37,944	37,331	39,116	39,400
Zinc metal	47,409	54,851	60,068	66,800	73,560	74,400
Mercury <sup>1</sup>	53,800	37,740	51,330	54,430	2,135	2,200

1. Flasks.

ite mine of San Leone, in Sardinia. The Ferromin Company was granted the concession in 1950, and in the same year began systematic exploration. Several million metric tons of ore were discovered; grades vary between 25 and 40 percent iron (magnetite). A new concentration plant was installed; presently, this plant (which includes dry and moist magnetic separation sections) has a capacity of 2,000 metric tons per day.

## LUXEMBOURG

Mining activities within the country are limited to iron ore. The oolitic hematite ores or 'minette' occur in the basins of Esch and Differdange, bordering France, and constitute part of the famous Lorraine iron ore deposits.

Iron and steel exports comprise 94 percent of the total export value of the country. Luxembourg has the highest per capita steel production in the world, 11.6 metric tons, and has a world rank of eighth in steel production.

Increase demands for steel mean that more crude ore must be imported, and within the past five years, the quantity imported has doubled. Most imported ore comes from France, whereas most of the exported crude ore goes to Belgium. Germany is becoming an increasingly important customer for crude ore; exports to that country rising from 90,190 metric tons in 1954 to 576,450 metric tons in 1957.

Three companies are engaged in the iron-steel industry: (1) Société Anonyme Acieries Réunies de Burbach-Eich-Dudelange (ARBED), (2) Société Anonyme des Hauts Fourneaux et Acieries de Differdange, St. Ingebert-Rumelange (HADIR) and (3) Société Minière et Métallurgique de Rodange.

### Luxembourg Iron-Steel Statistics in Metric Tons

Item	1956	1957
Iron ore extracted	7,594,000	7,843,000
Iron ore imported	5,339,000	5,479,000
Iron ore exported	1,844,000	1,652,000
Cast iron production	3,316,000	3,368,000
Steel production	3,456,000	3,493,000

## NORWAY

Mine production volume and value were at the same level as the record year 1956, but the future outlook is not as bright. The sulphide ore mines which account for better than half the production value are hit by the low copper and

zinc prices and the limited demand for pyrite. Pyrite production in Europe has been expanded materially in the last years, and, at the same time, native sulphur has taken over part of the market. Some Norwegian sulphide mines have decreased production, and more cuts are expected.

The iron ore mines which are first in production volume and second in value, are in better shape and expect continued expansion of their production. Their high-grade concentrates are in demand by the many sintering plants built in Europe during the last decade, and the prices have been kept on the same level for this year's contracts. A couple of old lump iron ore mines have been reopened on a small scale with favorable results.

Two new concentrating plants were put in operation in 1957. Bleikvassli in north central Norway is treating 300 tons a day lead-zinc-pyrite-ore by selective flotation; Gravdal in western Norway, 50 tons a day of cupriferous pyrite by bulk sulphide flotation; Orkla sulphide mines has expanded their sink-and-float section with another Swenson shaking-trough separator.

A/S Titania has broken ground on a 1,000,000-ton-a-year project for the extensive ilmenite ore deposit at Telnes. The schedule is for production in 1960. Rana Gruber is building a 10-ton-an-hour pilot plant to test flotation flowsheets for its low-grade iron ore deposits. Roedsand Mines has embarked on a program for tripling iron concentrate production. Sulitjelma Mines has announced plans for replacing the old flotation plant, the largest in Norway.

Prospecting, geological, and geophysical exploration and diamond drilling have been carried on at a brisk pace. Most of the efforts have been made in

the northermost part of Norway. Large-scale investigations have disclosed considerable amounts of copper ore both at Kautokeino and at Repparfjord, and the work will be resumed this summer. In southern Norway, the Fosdalen mine has reported the discovery of an extension of magnetite ore at greater depth, and the Folldal mine is exploring a promising sulphide ore about 20 miles from present operations.

## PORTUGAL

1957 brought a sudden decline in Portuguese mining activities. Production and value both dropped below the average amount of the last 20 years (7,500,000 tons of raw materials, and escudos 450,000,000, respectively). The chief cause was the decrease in price of some metallic ores, particularly sharp for tungsten, and accentuated in lead, zinc, and pyrite.

The country's important tungsten mines were caught by the unexpected price reductions and steadily declining market. The Portuguese government is now studying the possibilities of subsidizing production to aid these miners.

Nevertheless, 3,500 tons were produced in 1957, equaling about 75 percent of the 1956 output. During the last three months of the year, production was virtually nil. The only work now being carried on is that of maintenance. In a few mines some treatment of tailings is continuing just to keep the staff occupied.

The crisis in the pyrite mines was not so grave, but the situation is far from satisfactory. The country's position as a major supplier of sulphuric acid is especially threatened by the increasing use of native sulphur. These pyrite deposits were still being worked last year: Louzal at Grandola, Setubal; S. Domingos at Mertola, Beja; Aljustrel at Aljustrel, Beja. The positive results of the geophysical prospecting program of the Mining Development Bureau were confirmed, adding to the country's pyrite reserves.

Operations were fairly normal in mining the country's cassiterite deposits. The alluvial deposits at Beiras-Macainhas, Belmonte, and Guarda, and the vein deposits of Tuela (Vinhais, Braganca), Lagares (Satao, Viseu) Montesinho (Braganca) and others produced 1,150 tons, or approximately 65 percent of the 1956 output. The alluvial deposits are steadily decreasing, while the vein deposits appear to have a long life ahead, especially the Montesinho which is just getting under way.

Because of the tungsten crisis, many tungsten firms are exploring for cassiter-

**Norwegian Production of Metals and Minerals in Metric Tons in 1953, 1954, 1955, 1956, and 1957\***

Commodity	1953	1954	1955	1956	1957*
Iron ore conc. <sup>1</sup>	1,186,293	1,094,577	1,255,584	1,513,683	1,505,000
Ilmenite conc. <sup>2</sup>	128,113	149,185	157,833	190,503	210,000
Pyrite ore and conc.	744,856	794,114	843,776	863,000	850,000
Copper conc. <sup>3</sup>	24,763	26,375	26,772	27,932	29,000
Zinc conc. <sup>4</sup>	11,122	11,230	14,001	13,267	15,500
Lead conc. <sup>5</sup>	874	1,124	1,070	1,221	1,300
Molybdenum conc. <sup>6</sup>	258	265	288	300	300
Columbian conc. <sup>7</sup>	564	178	320	260	300
Graphite conc. <sup>8</sup>	2,953	3,622	5,416	5,000	5,670
Pig iron (electric)	58,844	59,920	123,332	180,000	N. A.
Aluminum	56,198	64,101	71,760	92,690	N. A.
Copper	12,104	12,891	13,737	15,180	N. A.
Copper Skjaerstone (33% to 35% Cu)	13,246	12,494	13,710	13,391	N. A.
Zinc	38,798	44,461	45,519	48,636	N. A.

\* Estimated. N. A. Not Available. 1. Aver. 64.5% Fe. 2. Aver. 44% TiO<sub>2</sub>. 3. Aver. 21% Cu. 4. Aver. 49% Zn. 5. Aver. 66% Pb. 6. Aver. 96% MoS<sub>2</sub>. 7. Aver. 50% CuO. 8. Aver. 80% C.

## Europe

### SWEDEN

ite. Panasqueira is presently exploring some of the tin mines at Vale da Ermida and Argemala in Castelo Branco which were practically abandoned until recently.

The Minas de Jales (Vila Pouca de Aguiar, Vila Real) continues to be the only real source of gold. Output for the year was about 627 kilograms, approximately 8 percent more than in 1956.

The Fragas da Carvalhosa (Moncorvo, Bragança) is still the only iron mine being explored. Its output in 1957 was about 190,000 tons, or about 12 percent more than in 1956. At the Vila Cova magnetite mine, installation of steel making equipment is continuing and almost ready to go into operation. The firm exported concentrate containing 63 percent Fe. The Orada magnetite mines (Serpã, Beja) produced 90,000 tons in 1957.

#### Mineral and Metal Production in Portugal in 1956 and 1957 In Metric Tons

I Ores	1956	1957
Amianthus	32	58
(a) Arsenopyrites	3,906	7,601
(a) Arsenopyrites auriferous and argentiferous (raw concentrates with 150 gr/t Au and 390 gr/tons Ag)	4,589	4,763
Barite	314	569
Beryllium (11% OBe)	221	168
Sphalerite	1,136	303
(b) Cassiterite (65% Sn)	1,768	1,521
(b) Cassiterite and ilmenite (mixed 25% Sn, 17% TiO <sub>2</sub> )	21	44
(b) Cassiterite and wolframite (mixed 25% Sn, 25% WO <sub>3</sub> )	1	486
Columbite and tantalite	27	13
Copper Ores (25% Cu)	803	5
Copper precipitated (60% Cu)	114	112
(c) Galena (60% Pb)	2,064	2,073
Hematite	163,025	182,080
Ilmenite (35% TiO <sub>2</sub> )	61	304
Kaolin	48,934	47,582
Magnetite	74,465	101,601
Manganese ores (42% Mn)	3,182	5,272
Molybdenite	11	15
(d) Pyrites	669,776	667,308
Scheelite (65% WO <sub>3</sub> )	246	293
Scheelite and cassiterite (mixed 25% WO <sub>3</sub> , 25% Sn)	136	160
Stibnite	—	20
Talc	86	—
(e) Wolframite (65% WO <sub>3</sub> )	4,313	3,344

II—Products from treatment of ores  
(a) Arsenious anhydride (97.9/9%) 906 72  
(b) Tin metal (99.5%) 1,145 998  
(c) Lead metal (99.8%) 851 552  
(d) Copper concentrates (8%) 9,202 10,883  
(d) Sulphur 17,194 16,943  
(e) Ferro-tungsten 346 266

Obs.—I—The II only includes the production of ore dressing plants, with the exception of tin metal, which is the total production for the whole country. The minerals that gave origin to these products are included in I.

2—The numbers mentioned in 1957 are subject to ratification.

### SPAIN

Spanish mining in 1957 featured increased production; especially from ore and mercury.

Iron mining was very active to supply the new steel plant siderurgica de Aviles as well as other expanding plants. Total iron ore used was 6,700,000 metric tons of which 1,400,000 were imported from Morocco. The Coto Wagner firm at Ponferrada produced 465,000 tons with plans for eventual expansion to 1,000,000 annual ingot tons.

Mercury exports were 47,931 flasks compared with 45,546 in 1956. However, actual production was far greater than in 1956 and can be expanded further as the Almaden mines continued new installations and worked on the Nos. 16 and 17 shafts.

Production and shipment of pyrite expanded slightly from the 2,307,530 tons of 1956. Germany continued to be the largest importer of pyrite and calcined pyrite.

Lead production was 61,286 versus 61,174 in 1956. However, at year's end lead mining was curtailed as prices fell. Blister copper output at 6,500 tons was unchanged. Metallic zinc output fell with the price to 21,700 tons. Zinc concentrate production was 140,000 tons.

Other mineral and metal production was 770 tons of tin; 16,000 tons of aluminum as new plants came into operation; 970 tons of wolframite; 1,411 tons of silver; and an increase in manganese to 38,000 up from 31,460 in 1956.

The great demand for iron ore and the improved labor situation have resulted in an increase in development work at the Swedish iron ore mines which during the last few years had been neglected. The year 1957 was also characterized by continued planning, new buildings, modernizing, and enlarging plants. Uranium prospecting resulted in granting 11 companies and individuals investigation concessions applied for in 40 areas during 1956 and 1957. In 1958, a considerably greater number can be expected.

Iron ore output amounted to 20,035,000 tons in 1957 which is a new record.

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# Europe

## Production and Export of Swedish Mineral Products in Metric Tons for 1953, 1954, 1955, 1956 and 1957

Commodity	1953		1954		1955		1956		1957	
	Production	Export								
Iron ore	17,130,000	14,553,000	15,416,000	14,083,000	17,450,000	15,654,000	19,075,000	17,290,000	20,035,000	47,467,000
Pyrite	386,291	12,000	398,235	10,448	391,561	15,781	489,119	55,328	498,853	101,138
Lead conc.	33,954	8,346	40,372	10,110	43,870	12,982	46,085	15,332	50,722	18,006
Zinc conc.	78,583	76,393	103,335	110,356	104,557	105,074	117,166	127,746	118,720	138,007
Copper conc.	52,679	—	53,476	—	67,163	—	69,232	—	76,996	—
Tungsten conc. <sup>1</sup>	440	—	450	—	458	—	450	—	505	—
Fluorspar	—	—	—	—	—	—	1,000	—	2,600	—

1. 60 percent WO<sub>3</sub>.

As of October 1, the Swedish state took over the main part of LKAB-Loussavaara-Kiirunavaara AB—which means that TGO's-Trafik AB Grängesberg-Oxelösund's 54-year activity at the Lappland mines came to an end. Kiruna, Malmberget, and Koskullskulle have become one administration unit, separated from TGO's mines in central Sweden—Grängesberg, and Strässa.

At Malmberget the new sorting plant was finished, and the building of a new beneficiating plant commenced. It will have an annual output of 600,000 tons of iron concentrate. Four new shafts are planned and the sinter plant will be extended for an annual production of 350,000 tons of pellets.

At Kiruna work at the central plant continued with increased machine installation, shaft sinking, and extension of the ore-stationary to cover 18 tracks. The output of iron ore, estimated at 10,300,000 tons during 1958, will be 12,000,000 tons in 1962. In the Swapavästra and Leveäniemi fields, investigations were carried out under the management of SGU.

At Grängesberg, sublevel caving is gradually being replaced by block caving. On the new 400-meter transport level, the ore is transported by Malmberg cars of 7 cubic meters capacity, then are emptied during motion. In the stopes loading is carried out by LM 100 machines into 2 cubic meters Granby cars.

At Strässa, where the annual output will amount to 430,000 tons of iron concentrate, the new shaft will be sunk to 150 meters. A concrete shaft tower, 48 meters high, was built which will contain a Koepe hoist for one skip and one man cage, both with counterweights. The sorting and beneficiating plants have been projected and the new sinter plant is being planned to have an annual production of 150,000 tons of pellets.

At mines in Kiruna, Tuolluvaara Gruv AB will increase production in 1961 to 570,000 tons, of which 140,000 tons will be concentrate. In order to increase ore hoisting in the central shaft, a new man shaft will be sunk to a depth of 500 meters. A shaft tower and a crushing mill will be built for treating breccia ore. By installation of wet separators and vertical filters it has been possible to increase the recovery, and, at the same time, reduce the moisture in the concentrate to 5 percent.

Stora Kopparbergs Bergslags AB is building a new plant to concentrate iron ore at Grängesberg for an annual production of 300,000 tons. A new shaft headframe was erected, and the new hoisting plants will be used in 1958.

At Tuna Hästberg, Bergslaget has sunk the shaft to the final depth of 550 meters, and in the new shaft tower a Koepe hoist for double-skip and single-passenger hauling is being installed. The new plant which is estimated to yield about 100,000 tons of manganeseiferous iron ore in size 0 to 6 millimeters yearly, is already in use.

In order to uncover further ore-bearing areas at Blöterget a surface rock tunnel, 1,370 meters long, is being driven to divert river water; two rock tunnels totaling 1,760 meters in length will be used for draining and to transport waste water.

At Ickorrbotten and Källbotten near Ludvika, AB Statsgruvor has built new shaft towers. The new plant at Håksberg which is estimated to yield 250,000 tons of iron concentrate yearly, and which will have a flotation department for hematite ore, is calculated to start at the beginning of 1958. The central shaft and the shafts at Ickorrbotten and Källbotten are being sunk to depths of 400, 325, and 300 meters, respectively.

At Norberg, AB Statsgruvor has completed the new 65-meter-high concrete shaft tower at the Mimer field which will contain Koepe hoists for a skip and a man cage, each with a counterweight. At 275-meter and 800-meter, transport levels are being driven to transport ore from the Prost and Stor mines to the new sorting and beneficiating plant at Mimer. It will have an annual capacity of about 35,000 tons of lump ore and 140,000 tons of iron concentrate. The new plant is scheduled to be in operation in 1960. During 1957 two-stage treatment using the Svensson heavy density process was introduced. The result was good.

Norbergs Grufvaltning is building a new plant at Lake Bäljsjön at Norberg which is estimated to yield 250,000 tons of lump ore and 200,000 tons of iron concentrate yearly. For the continued planning of the plant, experimental work is getting started on flotation of hematite. The pilot plant has an hourly capacity of 20 tons. The problem of hematite flotation has been solved, but experiments are continuing to get increased tonnage, further reduction of the phosphorus percentage, and to have the economical conditions made clearer. The conveyor heading which will start from the central mine at 350-meter depth to the mill will be 1,150 meters long, with an inclination of 18°. At 250-meter depth, the headings totaling 2500 meters in length from five caving blocks to the central mill, had been driven about 2,000 meters by year's end. The Gustaf Adolf shaft is being sunk to the depth of 300 meters, where the future transportation system will be located.

Surahammars Bruk started its new crushing mill at the Kallmora mine in Norberg. The plant calculated to receive 250,000 tons of ore yearly. Plans are being made to build a beneficiating plant which is to correspond in size with the ore delivered from the crushing mill. During the year a schlagbrecher-plant was installed at the 250-meter level.

In Vingesbacke, owned by SKF Hofors Bruk, mining started to the utmost limit with 6-meter-wide stopes and 11-meter-wide pillars which later are being taken out by long-hole blasting. The annual production is scheduled for 80,000 to 100,000 tons of iron concentrate.

In the Moss mine in Västmanland, the new dressing plant started an estimated annual production of 50,000 tons of magnetite concentrate. Knut's shaft has been sunk to the depth of 350 meters.

At Bisberg the ore in the Bisberg field indicated on surface by magnetic measurements has been investigated at a depth of 520 meters; it has been found that the ore occurs in two parallel veins. One of them which is 440 meters from surface has been followed for 500 meters and shown a width of 5.5 to 6.0 meters. The other vein has been cut off after 520 meters through a displacement. The investigation work is going on along with the development work in the big vein.

Regarding sulphide ores, SGU found during the year that the iron pyrite deposit with copper and zinc at Stekenjokk in Norrbotten contains 4,000,000 tons.

As of January, 1958 AB Zinkgruvor, owned by Bolidens Gruv AB, has become a special administration unit of the main company. The main office for the Zinkgruvan department is to be situated at Garpenberg.

The Boliden Company reports that the mining at Längeslegruvan during the year reached production capacity estimated to yield 200,000 tons of zinciferous pyrite ore yearly. The ore is transported by standard gauge railway underground to the central works at Boliden. The Akulla mine has been abandoned as depleted.

At Kristineberg, a new shaft tower was built at the new central shaft, and in the Adak district pilot plant was started at the copper deposit of the Brännmyra mine. Laisvall lead ore mine reached an annual production of 500,000 tons. A railway, about 2 kilometers long at a depth of 100 meters under lake Laisan, connects the two mining fields. Investigation of the Lövstrand mine in the parish of Dorotea has been temporarily suspended.

## UNITED KINGDOM

There has been little change in the mining position during the past year although the fall in the price of lead and zinc has been reflected in profit and in the amount of exploration being undertaken.

It is estimated that the output of pig iron and steel ingots in 1962 will be 20,000,000 and 29,000,000 tons, respectively. This calls for an enormous increase in supplies of both domestic and imported ore, while the financing of a five-year development program involves something like £600,000,000. Tonnage of iron ore in 1956 was about 16,200,000 tons and it is estimated that by 1962 it may be expanded to 23,000,000 tons.

The largest walking drag-line in the world, weighing 1,675 tons and equipped with a 282-foot tubular jib, was put to work in September. It has a 20-cubic-

## Europe

yard bucket and dumps 260 feet away at a height of 120 feet above the working level.

The fall in base metal prices has not encouraged further prospecting. The annual report of South Crofty Mine, producing tin in Cornwall, published in May 1957 showed a profit of £20,032 compared with £37,861 in the previous year. Since that time, the directors have issued the results for nine months operations, which indicate that due to increased working cost and the fall in the tin price, the estimated revenue of £272,600 is slightly below the expenditure at £277,700.

During this period, a great deal has been spent on modernizing much of the plant. Part of the new flowsheet in the table section of the plant was put into operation at the end of August and the heavy media separation plant should be running fairly early in 1958. Production has been increased somewhat, about 720 tons being sold.

Geevor Tin Mines Ltd., the only other major tin mine in Cornwall, has continued to provide good returns and in the accounts published at the end of August, a profit of £102,670 was shown before taxation which was slightly higher than in the previous year. The tonnage of ore milled was about 7,900 tons higher although the grade was slightly lower. Development was well maintained, however.

A new flotation section was put into operation during the year involving regrinding and scavenging both the froth and table flotation, concentrates being the sulphide rejects made in dressing the tin ore. As a result, a considerable reduction has been made of the tin content of this sulphide and operating costs reduced. The final sulphide product contains a considerable copper content and is sold as a byproduct. 693 tons of concentrate were sold in 1957.

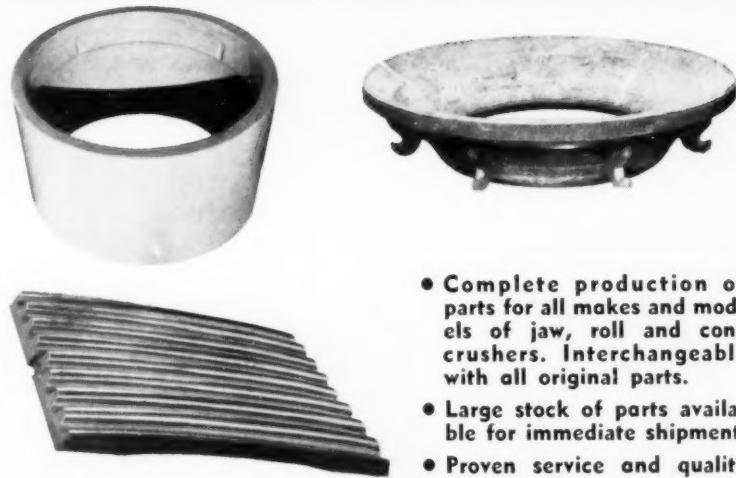
The new plant of Hydraulic Tin Ltd at Bissoe, Cornwall, designed to recover tin from accumulated tailing material, was put into operation in the early autumn. The new flowsheet involves washing, screening, concentration on Humphreys spirals for sand with Buckman tables for the finer material. Final cleaning is by flotation for sulphide removal and magnetic separation.

The small wolframite mine at Hawkswood, now owned by the Pena Copper Company, continued production on a small scale during the year, but all production ceased from Great Western Ores wolframite mine at Castle-an-Dinas. This company was a subsidiary of South Crofty Ltd.

No new developments in lead mining can be reported. Existing mines, namely Park mine at Llanwrst in North Wales, Halkyn mine in North Wales, and Greenside mine, near Lake Ullswater in Cumberland, are still operating on much the same level as in 1956.

The report for Halkyn United Mines published in July showed a lower profit of £45,300 compared with £65,426 in the previous year although 34,718 tons of ore were milled, but the grade was lower. The lead sold amounted to 2,748 tons, almost the same as in the previous year but the amount of zinc concentrate fell to only 454 tons. Development was disappointing, so that there was a further reduction in the calculated ore reserves, although they are still sufficient to maintain current output for three years without any further additions.

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## Europe

### Metric Tons of Iron Ore Mined, Pig Iron and Steel Produced in Yugoslavia in 1939, 1951, 1952, 1953, 1954, 1955, 1956, and 1957

Commodity	1939	1951	1952	1953	1954	1955	1956	1957
Iron ore	666,813	581,352	676,010	794,917	1,110,743	1,398,298	1,724,967	1,876,116
Pig iron	101,000	248,000	272,884	269,748	356,000	513,797	630,574	714,271
Steel	235,000	434,000	442,354	514,537	616,298	806,023	885,730	1,049,286

### Metric Tons of Ore Mined in Yugoslavia in 1939, 1951, 1952, 1953, 1954, 1955, 1956, and 1957

Ore	1939	1951	1952	1953	1954	1955	1956	1957
Lead-zinc	774,772	1,118,590	1,203,764	1,432,100	1,484,522	1,650,178	1,726,461	1,763,937
Copper	983,902	1,173,199	1,264,998	1,343,563	1,298,860	1,476,863	1,740,855	1,953,134
Antimony	18,963	55,088	74,594	61,450	75,258	80,474	83,056	85,547
Bauxite	718,594	453,357	577,196	462,309	680,597	791,057	881,418	888,240
Chromite	44,852	99,639	107,222	126,961	124,480	126,207	118,762	120,266
Manganese	5,656	12,868	N.A.	N.A.	N.A.	10,955	11,573	10,234
Pyrite conc.	78,064	113,541	N.A.	N.A.	N.A.	226,682	255,947	312,600

N.A. Not available.

The Lowland Company's mine at Wanlockhead, Lanarkshire, started its treatment plant and is now milling old dumps, accumulated tailing, and some development ore.

## YUGOSLAVIA

1957 was a year of full capacity production for Yugoslav mining. The output of several metals was the highest on record.

Lead and zinc ore production remained on the basis of 1956, but metal output increased. In comparison with 1939, and 1957 production of lead was nearly eight times higher and that of zinc six times higher. Where previously nearly half of the zinc concentrate was exported (32,327 tons in 1956), now the electrolytic zinc plant at Šabac converts most of it to metal and sulphuric acid.

The lead production of the Trepča smelters (Kosovo) was 65,221 tons of refined lead (63,216 tons in 1956) from several mines in Kosovo, Serbia, Macedonia and Montenegro. South of Trepča, the new Kišnica mine is being developed to a capacity of 150,000 tons of ore per year, containing 5 percent Pb and 1 percent Zn. In East Bosnia the Srebrenica mine is able to produce 100,000 tons ore per year, containing 5 percent Pb and 7 percent Zn. The Koporić-Kopaonik prospect northwest of Trepča is also very promising. Trepča is planning the retreatment of the flotation tailings for their contents of sulphur, iron, and manganese, and of the smelters' slags for their zinc and lead contents.

The smelters of the Mežica mine (Slovenia) produced in 1957 13,283 tons refined lead (12,543 tons in 1956) from their own concentrates. The new Dwight Lloyd sintering plant operates up- and down-draft very satisfactorily; the Short-Drum-furnaces are not yet in operation. A new flue channel and as second stack were built. The old mine Sitarevec near Litija (Slovenia) is being reopened and will produce lead, zinc, and barite concentrates.

The production of zinc doubled in 1957. The smelters at Celje (Slovenia) produced 16,481 tons (13,809 tons in 1956) and the electrolytic zinc plant at Šabac (Serbia) 12,978 tons (6019 tons in 1956). Šabac also produced electrolytic cadmium at a rate of 30 to 35 tons per year (8 tons in 1956). The capacity of the Šabac plants will be enlarged to 24,000 tons electrolytic zinc and 60 tons cadmium per year.

Copper ore output of the Bor mines (Serbia) increased 12 percent. Blister copper production increased 15 percent and electrolytic copper 20 percent, being higher than ever before. The new flotation plant has Fagergren cells, and the old flotation plant will be fitted with such cells. A new 400-meter shaft was sunk to undercut the open-pit workings. An agreement was signed with a French-Belgian financial group for the opening up of the Majdanpek mines at a rate of 10,000 tons 0.9 percent copper ore per day. Over \$50,000,000 will be spent for this and the reconstruction of the copper smelter at Bor. The work is well under way; a new railway line has been built to Debeli Lug (near Majdanpek), and the narrow gauge railway to Bor will be replaced by a normal sized one in 1958. At Bor and at Prahovo (on the Danube) the ground is being levelled for the new



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plants. Bor will produce 230,000 tons of sulphuric acid and deliver it to Prahovo where 575,000 tons of superphosphate will be produced per year.

Pyrite concentrate production increased 22 percent. Nearly 90 percent is from Bor, the remainder from Trepča.

Antimony ore output increased slightly, the metal production increased 7 percent. At Stolice near Zajča (Serbia), a new flotation plant with a capacity of 200 tons ore per day is under construction. Also a new shaft was sunk.

Mercury production at Idrija (Slovenia) was 7 percent lower than in 1956 as the ore was of lower grade. To decrease losses and increase metal production again, a big kiln will replace the ancient shaft furnaces. At Avala, south of Belgrade, prospecting for mercury ore shows promising results.

Bauxite output remained on the same level. In several places new deposits have been discovered. Most promising are the newly discovered deposits north of Titograd (Montenegro) where large quantities of high-quality bauxite are being developed. Alumina production was more than 50,000 tons, 80 percent of this from Kidričev (Slovenia), the rest from Moste-Ljubljana and Lozovac. Part of the alumina has been exported.

Aluminum production increased 23 percent; it is now 10 times higher than in 1939. Kidričev (Slovenia) produced 14,961 tons and Lozovac (Dalmatia) 3,173 tons. The agreement between Yugoslavia, the Soviet Union, and East Germany providing financial and technical help for the construction of a new alumina-aluminum plant near Titograd (Montenegro) was completed, and construction began on the necessary power plants and roads. The capacity will be 50,000 tons aluminum per year in 1964, later to be doubled.

Chromite output remained on the level of previous years. Most of it is used for the production of ferro-alloys, refractories, and chemicals. At the new Jegunovci plant (Macedonia), four electro furnaces have gone into operation since July 1957 producing high-grade ferro-silicon and ferro-chrome. Total capacity is 6,000 to 7,000 tons per year.

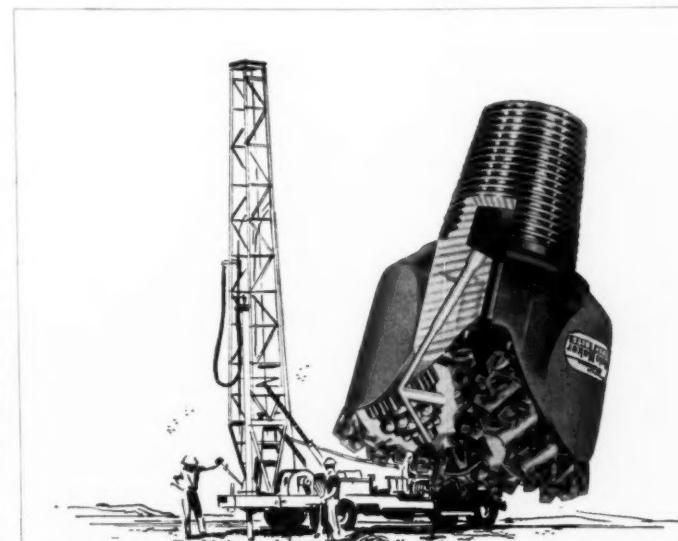
Iron ore output increased 9 percent, most of it from Vareš (Bosnia). At Damjan near Stip (Macedonia), a newly found magnetite ore body is being prepared for an output of 300,000 tons per year. Pig iron production has increased by 13 percent and steel production 18 percent totalling more than 1,000,000 tons.

The Five-Year Plan for 1957-1961 asks for a yearly increase of industrial production at a rate of 11 to 12 percent. In 1961 production of the main metals should be: steel 1,370,000 tons, copper 40,000 tons, aluminum 35,000 tons, lead 75,000 tons, zinc 32,500 tons, and mercury 530 tons. Investment preference is given to power plants, coal and oil mining, metal mining, smelting and fabrication, chemical industry etc. Several projects are listed as particularly important: the Majdanpek-Bor-Prahovo project providing an additional 25,000 tons copper per year, the 50,000-ton-per-year aluminum combine at Titograd, the Idrija kiln adding 100 tons mercury to the present production, the two lead-zinc mines at Kišnica and Srebrenica, and the enlargement of the zinc electrolytic plant at Sabac. 1957 production was well ahead of the estimate, except for mercury.

Metric Tons of Metal and Alumina Produced in Yugoslavia in 1939, 1951, 1952, 1953, 1954, 1955, 1956, and 1957

Metal	1939	1951	1952	1953	1954	1955	1956	1957
Refined Lead	10,651	60,068	67,180	70,796	66,729	75,612	75,759	78,504
Zinc	4,918	13,223	14,463	14,549	13,644	13,767	14,003	29,459
Blister copper	41,043	32,011	32,819	31,190	30,295	28,260	29,384	33,735
Electrolytic copper	12,463	14,004	21,390	27,764	26,946	24,837	25,008	30,128
Antimony	1,500	1,229	1,329	1,410	1,552	1,605	1,663	1,769
Mercury	378	505	504	492	498	503	456	425
Aluminum	1,795	2,828	2,563	2,792	3,496	11,499	14,682	18,134
Bismuth	—	88	99	98	110	104	111	100
Silver	1	94	80	95	88	93	86	81
Alumina	7,141	9,000*	NA	NA	NA	NA	48,206	50,236

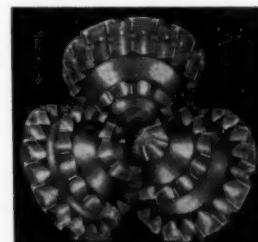
\* Approximate.



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# AFRICA

## ALGERIA

The instability of the region's political situation thwarted development of the mining industry in 1957. Nevertheless, some segments of the industry, notably iron, lead, copper, pyrites, and phosphate, maintained the level of 1956 output or even surpassed it.

Although iron ore output was not as great as in 1955, there was about a six percent increase in 1957 over 1956 with an output of 2,790,000 metric tons as compared with 2,600,000 in 1956. Some of the high-grade ore is exported to Great Britain. The country's reserves are now estimated at 100,000,000 tons, located chiefly at Quenza, Zaccar, and Beni-Saf.

Production of zinc decreased in 1957 to 49,000 tons, compared with 57,000 tons in 1956; lead ore output was 15,000 tons, compared with 14,500 in 1956. Copper ore production has been steadily increasing since 1955, with output in 1957 totalling 1,730 tons compared with 600 in 1956.

Antimony output decreased to 4,000 tons, compared with the previous year's total of 6,000. Pyrite mining produced 18,000 tons of ore in 1957, compared with 6,000 in 1956; in 1955 pyrite mining had been shutdown completely. Phosphate production was maintained at about 600,000 tons.

## BECHUANALAND

Production of chrysotile asbestos continued from Moshaneng mine in the Bangwaketse Reserve in the Southern Protectorate and the output for 1957 was 1,110 short tons above the figure for 1956. A limited amount of kyanite was produced from the Halfway Kop mine, in the Tati Concession. Some gold and silver was also produced in this area from small workings.

Two small manganese mines were opened in the south-eastern Protectorate during the second half of 1957 following the award of Crown Grants to two mining companies. The one occurrence is in the Bangwaketse reserve and ore occurs as pods and larger lenses in a shale horizon immediately overlying the Black Reef quartzites of the Transvaal System. No export of ore took place from this occurrence during 1957, but active development is in progress. The second occurrence is in the Bamalete reserve where the ore occurs as stringers, veins, and impregnations in a porous quartzitic sandstone associated with the Polo Ground Quartzite horizon of the lower Timeball Hill stage of the Pretoria series (Transvaal System). Pyrolusite and Psilomelane constitute the ore minerals. A limited amount of ore was exported from the Bamalete reserve in 1957. A characteristic feature of both occurrences is that the manganese ore is very low in iron.

A geochemical and magnetic survey was carried out at the Magogaphate nickel occurrence in the Bamangwato reserve to follow up the earlier work carried out there.

The Anglo American Corporation of South Africa, as technical advisers to De Beers Consolidated Mines Ltd., continued prospecting operations in the Tuli Block farming areas during 1957. The mineral rights in the Tuli Block are owned by the British South Africa Company.

## BELGIAN CONGO

The diamond production of the Belgian Congo reached a new record in 1957 with 15,644,000 carats against 14,010,478 in 1956. The increase is due to the Bakwanga mines which produced 15,016,000 carats of Lubilash diamonds, compared with 13,383,509 in 1956. These are practically all industrial diamonds. The production of the Kasai alluvial mines of the Fornière remained stationary at about 628,000 carats, compared to 626,969 in 1956.

The gold output increased to over 12,307 kilograms in contrast with 11,524 kilograms in 1956. The increase comes from the Société des Mines d'Or de Kilo Moto, the biggest producer, which is mining a primary deposit with important reserves.

The nonferrous metals were not affected much in 1957, but will be deeply influenced in 1958 by the decrease in world consumption and the fall in prices. The copper production of the Union Minière decreased from 250,000 tons in 1956 to 242,600 tons in 1957. The development program of this big company has not been stopped but it will be extended over a much longer period.

The connected production of cobalt also decreased slightly while the production of metallic zinc was not affected and increased from 42,084 to 49,194 tons.

Manganese ore production rose from 329,535 tons in 1956 to 367,021 tons in 1957.

Production of cassiterite remained almost stationary at 15,116 tons against 15,228 in 1956. To this must be added 2,802 tons of mixed ores containing about 2,240 tons of cassiterite. This situation will be entirely changed in 1958 as the International Tin Committee decided to curtail the exports and consequently the production. For the Belgian Congo the reduction is fixed at 40 percent for the first half of the year.

Production of columbite and tantalite fell from 418 tons in 1956 to 154 tons in 1957. This is due to the suppression of the bonus and the nonrenewal of United States contracts which practically closed the market. Sales are now very scarce and at prices which make the mining of these ores uninteresting.

Beryl is still produced but at a lower rate than last year. The deposits are very erratic and the pockets hard to find. Production of germanium for 1957 is not yet available but it probably is of the same importance as in 1956 which was about 600 kilograms. Until now germanium has been extracted only from the funes of the zinc plants but a deposit of germanium-bearing topaz has been reported. Cadmium production remained stationary at 275 tons compared to 277 tons in 1956.

## FRENCH EQUATORIAL AFRICA

Extensive preparations (surveying and planning) for mining and transportation of manganese and iron ores from Gabon continued in French Equatorial Africa in 1957.

Production of gold, lead, and diamonds were all down from 1956 outputs. Gold to 957 kilograms from 1,266; 52 percent lead concentrate to 3,480 metric tons from 6,000; and 61,000 carats of diamonds (from d'Oubangi) down from 145,800 in 1956.

## FRENCH WEST AFRICA

Prospecting by the "Executive Board of Mining and Geology" led to the discovery of deposits of iron ore and of bauxite in Guinée; of concentrations of ilmenite in the sands along the coast of Senegal; signs of copper in the Ivory Coast; and various pipes of kimberlite in the southern Soudan, where investigations for diamonds will be intensified.

During the year 1957, the production of iron ore increased to 1,091,000 metric tons, against 847,000 tons in 1956. This production rate should be maintained.

The production of bauxite decreased once more from 452,000 tons to 385,000. The exports were 362,000 tons. This decrease was brought about, to a great extent, through the reticence of the Canadian buyers, the most important clients of the producing company.

After the considerable progress made in 1956, the diamond production decreased from 390,000 to 222,000 carats in 1957.

The development of the washing plants for the sands of the beaches to the south of Dakar, has increased production from 20,000 to 36,000 tons of ilmenite.

## GHANA

Despite economic conditions Ashanti Goldfields Corporation Ltd. managed to achieve a record in that the milling and recovery figures during the last financial year were the best in the company's history. The mill handled 338,737 tons of ore for a recovery of 275,332 ounces of gold equal to 16% dwt. per ton. These record figures may be attributed to the recent policy of reconstruction which has provided a new shaft system with adequate facilities for hoisting and ventilation from deep levels while exceptionally high values continued to be exposed in current development. Another factor which affected operation favorably was that improvements in the roasting and cyanide practice have resulted in a substantial reduction in the amount of gold leaving the plant in cyanide residues.

As far as the other gold producers are concerned Ariston Gold Mines (1929) Ltd. gave high priority to deep exploration on account of good values being encountered in an ore body which split into two sections which may mean that there will be two payable reefs instead of one. Better extraction rates were also obtained following the adoption of a new gold reduction process.

At Bibiani (1927) Ltd., efforts were made to prove the extent of values located on the surface while a systematic investigation was also being carried out in order to establish whether a useful tonnage can be obtained in some of the old workings on the upper levels of the mine.

In the diamond mining industry Consolidated African Selection Trust Ltd. met greater difficulties in that the accessible high grade ground is becoming scarcer

## Africa

### Ghana Mineral Exports and Value in 1954, 1955, 1956, and 1957<sup>1</sup>

Commodity	1954		1955		1956		1957	
	Quantity	£ Value	Quantity	£ Value	Quantity	£ Value	Quantity	£ Value
Bauxite <sup>2</sup>	156,956	276,258	116,285	203,505	137,872	331,207	123,356	301,757
Manganese <sup>3</sup>	423,038	4,812,690	539,580	5,192,232	635,851	7,043,796	500,512	6,987,726
Gold <sup>4</sup>	724,703	9,005,506	723,905	9,048,535	599,340	7,488,781	580,093	7,228,514
Diamonds <sup>4</sup>	1,963,670	3,719,712	2,276,531	5,529,624	2,518,563	7,920,446	2,230,715	7,238,353
Total Value:	17,814,166		19,973,896		22,784,230		21,756,350 <sup>1</sup>	

1. First nine months. 2. Long Tons. 3. Troy ounces. 4. Metric carats.

but a 25 percent higher rate of production of lower ground enabled the company to produce an unchanged diamond recovery. To mine the lower grade deposits further a new washing plant (costing about £800,000), which will be half completed in 1959 and in full operation in 1961, will be erected.

The output of manganese has and still suffered from the depressed state of the base mineral market and the same applies to bauxite production. As far as the latter is concerned the £300,000,000 Volta River hydroelectric plan which aims at producing cheap electric power, which would make it possible to produce aluminum from extensive bauxite deposits made no progress.

An official statement from Mr. Gbednah, the Finance Minister stated that Ghana did not intend to nationalize the mining industry "either now or in the immediate future" was of great value.

## KENYA

There was a small increase in mineral production in Kenya during 1957 as compared with 1956. Magadi Soda Company continuing as the main producer. Value of soda ash and salt produced at this property was £1,480,394.

Due to rising costs of production, gold output and value during the year (£91,000) fell by nearly 50 percent from 1956 (£172,000). Blister copper production from Macalder-Nyanza mine was 2,115 tons valued at £421,774. These results reflected the first full year's production from the new mill opened in April 1956.

Owners of the kyanite property at Murka continued reequipping of the mine and mill, but no mineral was produced. Graphite production from the S. V. Deyshi mine was doubled at 942 tons worth £47,125.

Investigations continued at the Anglo-American Prospecting Company's Mrauna Hill columbite property.

## MADAGASCAR

Graphite continued to be the most important mineral in Madagascar in 1957. Production and exports were maintained at 15,000 to 16,000 annual metric tons (10,000 fine grains and 6,000 powder).

Mica output increased to 800 tons from 540 in 1956. It should be maintained at higher rate in 1958.

Prospecting disclosed important tonnages of monazite sands during the year.

## MOROCCO

Several all-time records were achieved by Moroccan mines in 1957, both from the production and the export points of view. Total exports, the north and south zones counted together, were approximately 20 percent better than in 1956.

As usual, phosphates were the most valuable and the most voluminous, 1957 output reaching the record total of 5,567,519 tons as against 5,521,817 tons the year before. Exports totaled 5,356,574 tons and local sales were 75,239 tons.

Next largest tonnage was produced by the iron ore mines with 1,400,200 tons from the Spanish mines at Nadir and 467,922 tons from the French mines at Ait Amar and elsewhere in southern Morocco, making a grand total of 1,868,122 tons, another record for Morocco. Exports (southern area only) were 407,197 tons to Britain, 72,880 tons to West Germany, and 18,603 tons to The Netherlands, a total of 498,680 tons.

Lead mining progressed from 120,047 tons of ore in 1956 to 127,108 tons in 1957, plus 1,356 tons from northern area mines making a total of 128,464. During the year the Jebel Aouam mine near Khenifra (Penarroya) went into operation and produced 530 tons of ore monthly at 10-11 percent; working full blast, these workings are expected to produce 1,000 to 1,500 tons monthly or as much as Morocco's biggest producer so far, the Aouli mines in eastern Morocco.

Manganese topped all previous production figures with 414,435 tons of metallurgical grade and 77,053 tons of chemical, as compared to the 1956 figures of 383,115 tons and 38,294 tons, respectively. Demand for chemical grade was so high that ready buyers were found for 53,529 tons, while a total of 344,759 tons of lower grades went for export.

Cobalt (4,230 tons compared to 6,438 tons in 1956) and copper (2,138 tons compared to 2,863) were disappointing, and operating difficulties do not seem likely to improve much in the coming year.

Lead metal and silver production continued to be steady stand-bys for export; 29,708 tons of lead metal were shipped to France, the USA and Algeria, while 17 tons of lead metal and 287 tons of lead piping went to the local market. Silver extracted from eastern lead-zinc ores totaled 26,714 kilograms exported to France.

Mine operators generally had to face rising costs in 1957, the main item being the increase in wage scales demanded by the Moroccan Labor Federation. Several strike threats in support of wage claims were averted after the intervention of the Moroccan authorities, mainly at Penar-

oya's Mibladen and Aouli lead-zinc mines, the Imini manganese mine, and the Sidi Maarouf concentration plant in Casablanca (operated by the Société Anonyme Chérifienne d'Etudes Minières).

## MOZAMBIQUE

The governmental ban on radioactive mineral prospecting ended in Mozambique in 1957. However, licenses were hard to obtain and no important discoveries were reported. Tete district where davidite is found along a gabbro limestone contact is the most important source of uranium in Mozambique.

Intensive and systematic prospecting brought success to Companhia Mineira Lillas of Mozambique. Spectacular beds of coal were found cropping out in the bed of the Morungodzi River in the Tete district. This new field is only eight miles from the Moatize railroad station. Important iron ore deposits had previously been discovered in the area by Companhia Lillas so extensive exploration drilling is programmed for 1958 and 1959.

Despite the serious drop in the price of copper the Central Mining and Investment Company of Johannesburg continued its drilling program for copper in the Tete district.

The governor general of Mozambique, Commodore Gabriel Teixeira, has done much to aid the mining industry by encouraging road and railroad building. The Portuguese government considered proposals to rewrite the ancient laws dealing with mining so that companies will be encouraged to invest in the country.

Also to promote mining the government asked for and accepted several tenders from foreign companies for prospecting in the Tete and Alto Ligonha districts.

## NIGERIA

Production of cassiterite continued to expand in Nigeria at an increasing rate up to the end of November 1957, when the statistical position of tin showed a critical surplus which forced the International Tin Council to introduce export restrictions. In the case of Nigeria this meant cutting production by 40 percent whereas the restrictions imposed on all producers covered by the tin agreement worked out to only 28% percent. As a result 1957 exports were slightly lower than the shipments made during 1956.

As could be expected columbite production declined during the year because the metal price was so low. The trend is for further reductions as demonstrated by

### Nigerian Minerals and Export Value in 1954, 1955, 1956, and 1957<sup>1</sup>

Commodity	1954		1955		1956		1957	
	Metric Tons	£ Value						
Tin	10,309	5,170,344	11,399	5,868,474	13,364	7,297,490	13,150	7,160,000
Columbite	2,524	5,127,613	3,047	5,166,927	2,406	1,762,135	1,923	1,177,000
Tungsten	7	4,470	5	2,153	3	4,267	2	800
Lead	154	10,034	73	3,963	105	8,450	623	49,000
Zinc	125	3,575	—	—	—	—	—	—
Tantalite	5	13,725	9	9,692	15	20,266	17	34,000
Other Minerals	—	—	—	—	749	29,525	1,247	75,000
Gold <sup>2</sup>	—	—	—	—	—	—	487	6,000
Total Value:	10,329,561		11,051,209		9,122,133		8,499,800	

1. Approximate. 2. Troy ounces.

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## Africa

the fact that in July 1957, the output was 241 tons but in December production was only 113 tons—the lowest for five years.

No progress was made regarding the reopening of the Abakaliki lead-zinc mine but negotiations were continued regarding the financing of this project. Production came mainly from small underground workings near Wase which gave an output of 400 tons of galena in the first half of 1957, dropping to 177 tons in the second half.

A strong demand was built up for tantalite but known occurrences are small and sporadic. There was a steady production of monozite from alluvial sources and thorite was won from mill rejects obtained from primary columbite processing.

A milestone in the history of Nigeria has been reached in that diamond prospecting may now be carried out if a special license is obtained whereas hitherto the country was completely closed for diamond prospecting.

The total number of mining operators was 166, 13 more than in 1956 and their combined labor force amounted to 58,180 which compares with 60,249 in the preceding year.

## NORTHERN RHODESIA

The year 1957 was very eventful for the mining industry of Northern Rhodesia. Commencing with confident optimism, despite falling demand for base metals, two new copper mines and a metallurgical plant were brought into production. Toward the end of the year, however, with base metals as their lowest prices for several years, there was a reassessment of the position and, in some cases, a voluntary reduction in output.

The Bancroft mine, of the Anglo-American Group, with a rated capacity of 40,000 long tons of copper per year, was rapidly brought into production and started up on a limited tonnage rate at the beginning of the year to take advantage of the high copper prices. Serious mining difficulties were experienced as a result of bad ground and excessive water, and at no time was the rated capacity reached. With the low copper price at the end of the year, it was generally recognized that Bancroft operated at a substantial loss.

Kansanshi Copper Mining Company Ltd., a small copper mine situated to the west of the Copperbelt and near the Belgian Congo border, was flooded in November following a breakthrough into a large pocket of underground water. This is an old mine with a somewhat chequered past and had been reopened by Anglo American Corporation for the purpose of making a thorough examination of its possibilities. In view of the heavy inflow of water and the low price of copper, the decision was made to leave further work in abeyance.

Nchanga Consolidated Copper Mines Ltd., which is the lowest cost Copperbelt producer as a result of its high grade ore and cheap block caving method of mining, continued the development of its two open pits but at a reduced tempo. Additions to the concentrator were completed during the year and part of the tonnage milled was made up of highly oxidized ore from the open pit.

Rhokana Corporation Ltd. became the first, and only, producer of uranium oxide in Northern Rhodesia when the Nkana mine uranium plant was started up in mid-year.

Rhodesian Selection Trust was able to raise £16,000,000 for the purpose of financing the development of the Mufulira West ore body to the production stage of the 8,000 tons of ore mined and milled per day. This work will be continued but it was not possible to obtain acceptable terms to finance the promising Chambishi project (copper) which was left in abeyance.

Construction at Ndola Copper Refineries, a Roan Antelope Copper Mines Ltd.'s subsidiary which will electrolytically refine copper from that mine, proceeded without interruption during the year. The first unit of the refinery, with an annual capacity of 55,000 long tons of copper, is scheduled to go into operation in 1958. Preliminary work is also well under way on the second unit to double capacity. The adjoining cobalt plant of Chibuluma Mines Ltd. started up during the year after some initial technical difficulties and produced an enriched cobalt-copper matte from mixed Chibuluma cobalt-copper concentrate.

In July, in an effort to prevent a further fall in copper price, Selection Trust Group proposed, and adopted, a 10 percent cut in production for their two major mines, Mufulira and Roan Antelope, but the

### Metal and Mineral Production in 1955 and 1957 and Value in Rhodesian Pounds

Commodity	1955		1956		1957*	
	Quantity	Value £	Quantity	Value £	Quantity	Value £
Gold <sup>1</sup>	362.5	4,525	3,329.42	41,067	3,802	36,550
Silver <sup>2</sup>	109,130	34,964	609,107	191,285	534,056	165,728
Cobalt, metal <sup>3</sup>	8,228	967,640	16,442	1,928,700	21,453	1,983,090
Cobalt, alloy <sup>2</sup>	7,464	291,030	2,416	110,478	077	46,862
Cobalt, others <sup>2</sup>	5,744	297,944	7,061	357,728	45,186	464,932
Copper, blister <sup>4</sup>	165,074	52,230,345	157,531	47,271,095	169,531	34,200,053
Copper, concentrate <sup>4</sup>	973	45,919	584	29,659	2,692	119,906
Copper, electrolytic <sup>5</sup>	177,098	61,659,741	225,953	73,729,521	246,680	54,416,299
Copper, other <sup>6</sup>			70	19,805	831	66,981
Iron, ore <sup>8</sup>	2,184	2,184				
Lead <sup>8</sup>	16,050	1,700,247	15,200	1,768,495	15,000	1,436,559
Manganese ore <sup>8</sup>	17,331	204,424	39,438	491,422	36,869	479,802
Selenium <sup>8</sup>			32,712	121,764	26,656	106,520
Zinc <sup>8</sup>	27,900	2,529,839	28,925	2,828,266	29,500	2,396,028
Uranium oxide <sup>4</sup>					52,457	
Beryl <sup>8</sup>	17.64	2,505	12.34	1,531	5	595
Limestone <sup>8</sup>	104,590	333,290	367,046	371,997	449,283	376,400
Mica, sheet <sup>4</sup>	4,557	570	5,821	1,455	627	157
Phyllite <sup>8</sup>			4,215	632	16,966	2,545
Amethyst <sup>8</sup>			3,128	120		
Cadmium <sup>8</sup>			52	69,721	56	74,124
TOTAL VALUE		£120,305,156			£129,334,941	£96,373,129

1. Fine ounces 2. Hundredweight 3. Long tons, 2,240 pounds 4. Pounds \* Preliminary subject to adjustment.

new, relatively small, Chibuluma mine was left at full output. Anglo-American rejected a similar proposal, using the argument that the inability of Bancroft to reach scheduled capacity was, in effect, a potential reduction in output. In this connection it is to be noted that overall copper production in Northern Rhodesia was some 33,000 tons higher in 1957 than in 1956, despite the output cuts.

Production of manganese ore continued from the Bahati mine, near Fort Rosebery, and additional leases in that area were taken up by the Vanadium Corporation of America.

Towards the end of the year, Rhodesian Broken Hill closed down the lead blast furnace but continued a limited production of lead with a Newman hearth. Zinc and cadmium production were continued at practically the same level as for the previous year.

## NYASALAND

The principal interest in minerals in Nyasaland during 1957 was again focused on radioactive minerals. Some of the monazite bearing sands on the western shore of Lake Nyasa have been fully examined but development has not commenced. The sands contain ilmenite, rutile and zircon as well as radioactive monazite. The deposits on the eastern lake shore were not investigated to the same extent.

The deposits of uranium bearing minerals, including davidite and betaflite, discovered in 1956 by a mining company prospecting in the Tambani area to the west of the middle Shire Valley were still the subject of investigation by that company. It is not yet known whether these will prove economic.

A British company, engaged in the titanium industry, made good progress with its investigations of the ilmenite and rutile deposits in the lower Shire Valley between Chiromo and Port Herald. The company established a laboratory on the site to enable advanced examination to be carried out there.

The Anglo American Corporation did no field work on the apatite deposit at Tundulu Hill during the year. The results of sampling having shown that the quantity of high grade ore is rather less than had been expected, the corporation was engaged in carrying out ore dressing tests with a view to raising the average grade of product in order to meet the high cost of transport which would be involved in exporting the ore to a factory in Southern Rhodesia, where it could be converted to fertilizer.

Interest was maintained in the vermiculite deposits near Mpatamanga to the west of Blantyre and in the pyrochlore deposits on Chilwa Island. In view of the present low market price and lack of demand for pyrochlore it appears that it would not be economic to work the latter at the present time.

The holders of the mining lease intimated that they have decided not to do any further work on the cerium-rich monazite at Kangankunde Hill in the Zomba District, in view of difficulties experienced in working out an economic method of extraction for the monazite. As this deposit is rich in rare earths it is expected that further investigations of it may be undertaken in the not too distant future.

Appreciable interest has been shown in a substantial iron ore deposit in the Blan-

tyre District of the Southern Province and at the end of the year a large trial consignment was being mined for shipment to Europe.

## SIERRA LEONE

The system of licensed mining and buying of diamonds continued in force in 1957 and, following a series of well-organized raids by illicit miners, security arrangements were tightened. As a result authorized buying increased and this is one of the reasons why diamonds and not iron ore were the leading export commodity. Another reason is that the Dia-

mond Corporation's official buying agency is offering higher prices as practically demonstrated by the fact that the average price per carat on the basis of the first nine months of 1957 was about 158 shillings whereas the average price realized during 1956 was only 107 shillings. Nevertheless a very considerable amount of illicit traffic in diamonds existed.

The diamond export figure for the period January to September 1957 was 679,144 metric carats valued at £5,377,120 which compares with 478,627 valued at £2,708,620 during the corresponding period of 1956, and 647,797 carats valued at £3,457,385 for the whole of 1956.

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# Africa

Sierra Leone Selection Trust Ltd. was the leading diamond producer and will likely remain in that position in the future, particularly in view of the fact that the firm was erecting a £550,000 diamond treatment plant at Tongo at year's end.

Iron ore exports during the first nine months of 1957 and the corresponding 1956 figures (in brackets) were 1,103,726 (988,660) tons valued at £3,312,410 (£2,994,946) which compares with the 1956 total of 1,328,019 tons valued at £4,003,016.

Chrome ore exports were running below 1956 level, the tonnage shipped between January and end of September 1957 being 11,984 tons valued at £126,075. During the same period of 1956 the tonnage amounted to 14,237 which brought in £131,280 whereas exports covering the whole of 1956 came to 18,774 tons valued at £194,630.

British Titan Products continued prospecting of its rutile deposits but arrangements for mining had not been made at year's end.

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## Mineral Exports from Sierra Leone for 1954, 1955, 1956, and 1957\*

Commodity	1954		1955		1956		1957	
	Quantity	£ Value						
Diamonds <sup>2</sup>	443,593	1,699,875	401,423	1,400,478	647,707	3,457,385	679,144	5,377,120
Iron ore <sup>3</sup>	877,306	2,707,324	1,331,573	3,709,595	1,328,019	4,003,016	1,103,726	3,312,410
Chrome <sup>4</sup>	15,120	135,025	17,750	192,331	18,774	194,630	11,984	126,075
Gold <sup>4</sup>	2,530	26,573	200	2,542	400	4,741	N.A.	N.A.
Total Value:	4,598,797		5,304,946		7,659,772		8,815,605	

1. First nine months of 1957. 2. Metric carats. 3. Metric tons. 4. Troy ounces. N.A. Not available at date of publication.

## SOUTH WEST AFRICA

Increased interest in South West Africa's mining potential by major companies was the highlight of 1957.

An extensive aerial and ground prospecting program was advanced by the Anglo American Corporation's group. The Consolidated Gold Fields of South Africa's group initiated prospecting. Mineral Development Corporation (Pty.) Ltd. was formed by African Metals Corporation (South Africa) to take over properties and investigate mineral rights. Tsumeb Corporation Ltd. (the United States firm, Newmont Mining Corporation) discovered two ore bodies at the Asis mining claims 30 miles from Tsumeb containing 1,000,000 tons of 11 percent combined lead plus copper. Exploration was continuing at year's end.

Consolidated Diamond Mines developed a new area, and expanded output further; continued with its program of

modernizing and modifying plant and installing additional equipment; and had on its schedule, the erection of a new recovery section. Industrial Diamonds of South Africa (1945) Ltd. opened up a new diamond terrace located in the company's Luderitz holdings, from which production was initiated. Extravagant claims of rich diamond disclosures in the Karasburg concession area of the South West African Diamond Corporation were officially denied; but reports have persisted that diamonds, as well as tantalite and monazite occurrences were disclosed.

South African Minerals Corporation consolidated its position as a major manganese ore producer, in which underground operations were initiated to supplement surface quarrying, and planned further improvements of its rail-head and port loading facilities.

There were unconfirmed reports of the discovery of a major copperbelt. Lorelei Copper Mines, developed on a small scale copper-molybdenite deposits in which reserves of 20,000,000 tons were proved

## Production Sales and Sales Value of Important Metals and Minerals Produced in South West Africa in 1955, 1956, and 1957\*

Commodity	1955	1955	1956	1956	1957	1957
	Production	Value	Production	Value	Production	Value
Diamonds <sup>1</sup>	812,786	£14,219,570	988,039	£19,059,075	996,610 <sup>2</sup>	£15,912,796
Lead <sup>3</sup>	8,709	—	221,361 <sup>3</sup>	14,521,845	246,465 <sup>4</sup>	10,902,664
Copper <sup>3</sup>	23,562	—	—	—	1,678	41,123
Zinc <sup>3</sup>	23,231	—	—	—	—	348,600
Manganese ore <sup>3</sup>	30,013	169,532	57,262	610,172	89,661	1,026,442 <sup>3</sup>
Lead Vanadum <sup>3</sup>	7,663	478,286	4,050	335,610	3,512 <sup>3</sup>	267,870
Lithium ore <sup>3</sup>	4,253	85,123	5,645	63,906	6,743	97,014
Silver <sup>4</sup>	979,214	—	1,632,287	—	—	—
Tin cone <sup>3</sup>	372	136,000	449	180,457	634	289,000
Cadmium <sup>3</sup>	702	—	—	—	1,420	—
Beryl ore <sup>3</sup>	398	46,650	454	46,563	386	158,089
Germanium <sup>3</sup>	—	—	10	—	—	—

\* Records of Government Mining Engineer. 1. Metric carats. 2. 910,803 carats gem stones. 3. Short tons. 4. Troy ounces. 5. Estimated. 6. Total lead, zinc, copper concentrates.

## Metal and Mineral Production and Value in Southern Rhodesia in 1955, 1956 and 1957

Commodity	1955	1956		1957		
	Quantity	£ Value	Quantity	£ Value	Quantity	£ Value
Gold <sup>1</sup>	524,701	6,512,846	536,392	6,657,964	536,849	6,663,635
Gold premium <sup>2</sup>	—	69,300	—	66,735	—	84,672
Silver <sup>1</sup>	76,837	24,693	76,870	25,229	74,179	24,219
Antimony ore <sup>3</sup>	370	6,860	114	10,944	139	12,481
Arsenic <sup>3</sup>	508	4,062	1,084	8,672	885	6,260
Asbestos <sup>3</sup>	105,261	7,051,831	118,973	8,524,671	132,124	9,016,388
Beryllium ore <sup>3</sup>	964	108,303	606	69,045	572	63,751
Chrome ore <sup>3</sup>	449,205	2,191,993	448,968	2,671,088	654,077	4,517,500
Chromite ore <sup>3</sup>	6,12	9,711	2,544	1,463	38	120
Copper <sup>3</sup>	1,179	259,668	1,932	405,577	1,118	254,444
Corundum <sup>3</sup>	1,169	6,448	4,448	21,570	4,506	29,320
Fluorspar <sup>3</sup>	480	3,506	3,506	3,487	97	339
Iron ore <sup>3</sup>	92,835	1,469	127,954	23,030	148,768	27,903
Lead conc. <sup>3</sup>	27	1,196	31	1,897	43	2,194
Lithium conc. <sup>3</sup>	—	—	—	—	—	—
Amblygonite conc. <sup>3</sup>	180	6,300	646	31,446	121	3,213
Eucryptite	—	—	—	—	56	1,200
Petalite ore <sup>3</sup>	24,210	120,828	13,524	67,620	9,934	48,987
Lepidolite ore <sup>3</sup>	57,714	201,063	84,599	302,396	93,543	380,767
Spodumene <sup>3</sup>	51	233	4,445	17,271	5,599	19,536
Magnesite <sup>3</sup>	11,610	32,237	8,611	12,917	2,910	4,365
Manganese ore <sup>3</sup>	1,330	665	816	408	1,785	893
Mica block <sup>3</sup>	141,616	36,387	123,214	35,650	70,044	23,787
Nickel ore <sup>3</sup>	18,20	427	200	8,398	359	21,020
Tantalum conc. <sup>3</sup>	2,23	3,414	14,66	21,708	38,48	41,762
Tin conc. <sup>3</sup>	336,6	144,071	566,9	262,370	47,44	19,461
Tungsten conc. <sup>3</sup>	226,27	144,738	264	168,133	167	91,602

1. Fine ounces. 2. By government. 3. Short tons. 4. Pounds.

and/or indicated, planned an increased milling and treatment rate, including the provision of differential flotation of copper and molybdenum concentrates.

## SOUTHERN RHODESIA

In spite of tremendous decreases in metal prices during 1957, the year again proved a record one for mineral production. Values totaled over £25,000,000. The major increases were in asbestos and chrome, though figures for the latter are misleading in that they represent chrome railed: during the year, the Rhodesia Railways succeeded in overtaking a great backlog of chrome transport.

Though lower grade varieties of chrome proved more difficult to sell, a great spurt in pegging activity took place at the year end. Much deep level ground is known to exist along the centre of the Great Dyke, and it was this portion that attracted the interest of several mining houses not normally associated with chrome mining.

The Messina Transvaal Development Company brought its Mangula copper mine to production with the starting up of one Aerofall mill unit, and concentrates are being shipped. This company's production from the small Umkondo mine continues, but it has ceased drilling on its Sanyati claims.

A discovery of very good quality emeralds in the Belingwe Reserve caused international interest. Development is being carefully controlled so as not to effect the limited world market.

The closing down to a care-and-maintenance level of Rio Tinto's much vaunted Empress nickel mine in the Ngondoma came as a considerable disappointment to the mining community as a whole. The reasons for suspending development operations are given as insufficient reserves proved to date, coupled with the necessity for a good copper price.

Lithium minerals continue to be a major new export, and it is believed that Rand Mines Limited and Billiton Maatschappij are both considering entering this field. Southern Rhodesia's potential reserves of this mineral are virtually unlimited.

Southern Rhodesia looks like being a nonstarter in the atomic minerals race, in spite of considerable efforts made by the United Kingdom Atomic Energy Authority to stimulate uranium prospecting. The Authority commissioned Hunting Geophysics Limited to carry out a scintillometer survey covering a degree square of little known, but likely, country. Maps of the anomalies were sold to the public at nominal price, and though a considerable pegging rush ensued, no worthwhile find has so far materialized.

## TANGANYIKA

Provisional value of mineral production in Tanganyika during 1957 is £5,460,000, a slight increase over 1956. Diamonds remained the mainstay of the industry and there was increased production at Williamson Diamond, Ltd. with the new recovery plant operating at high efficiency.

Uruwira Minerals Ltd.'s Mpanda mine

**Production and Export of Metals and Minerals in Tanganyika and Their Value in 1955, 1956, and 1957**

Mineral	1955		1956		1957 <sup>1</sup>	
	Quantity	Value	Quantity	Value	Quantity	Value
Diamonds <sup>2</sup>	322,607	£3,199,437	357,538	£2,855,273	372,738	£3,287,782
Gold (refined) <sup>2</sup>	68,892	864,279	59,293	741,582	54,088	678,287
Gypsum (raw) <sup>3</sup>	7,812	16,285	9,450	18,167	9,510	17,998
Kalins <sup>4</sup>	46	507	10	105	—	—
Lead concentrates <sup>5</sup>	8,822	790,000	14,251	1,210,332	12,625	882,477
Lime <sup>6</sup>	955	4,471	782	3,476	484	2,424
Magnesite <sup>6</sup>	328	820	243	597	254	635
Meerschaum (crude) <sup>6</sup>	4,50	227	6	290	4	177
Mica (sheet) <sup>4</sup>	65	68,083	57	58,734	67	69,474
Mica (waste) <sup>4</sup>	274	2,739	125	925	—	—
Salt <sup>6</sup>	9,498	90,207	9,359	92,613	8,572	85,207
Silver (refined) <sup>3</sup>	43,292	13,990	35,020	11,504	20,520	6,739
Tin concentrates <sup>4</sup>	55	29,114	21	11,741	20	10,755
Tungsten concentrates <sup>4</sup>	24	17,625	15	10,929	—	—
TOTAL: (Exports only)	—	£5,097,924	—	£5,016,268	—	£5,041,955

1. Estimated 2. Metric carats 3. Fine ounces 4. Long tons 5. Metric tons

was seriously flooded in April causing a one month stoppage. Production of lead fell from 14,251 tons in 1956 to 12,625 tons in 1957.

Gold production was also slightly lower. Further development work continued at the Geita mine. At Kiabakari (Tangold Mining Company Ltd.) a 450 foot shaft was sunk and a 15,000 to 20,000 ton a month treatment plant almost completed. Exports from the Chunyu goldfield were down to 4,315 ounces.

At the Mbeya Exploration Co., Ltd., a pilot mill with capacity of 150 tons a day, commenced test production for pyrochlor. Exploration and drilling of the ore body continued at this property and power-supply problems were investigated. Metallurgical tests indicated that a successful high grade columbium concentrate can be made.

At the Kyerwa Tin mine, near the Uganda border, work on the new 1,000 ton per day mill continued, but wolframite production in this area dwindled to nothing, reflecting a decrease in world tungsten prices.

Most significant feature of 1957 was the detailed prospecting following extensive aerial surveys carried out in 1956. A 34,000 square-mile concession was granted to Western Rift Exploration Co. Ltd. and copper mineralization in the Sango-Karema area was examined, also the Nguallo carbonatite.

New Consolidated Goldfields Ltd. studied monazite occurrences in Morogoro district and copper-gold mineralization at Mara.

## TUNISIA

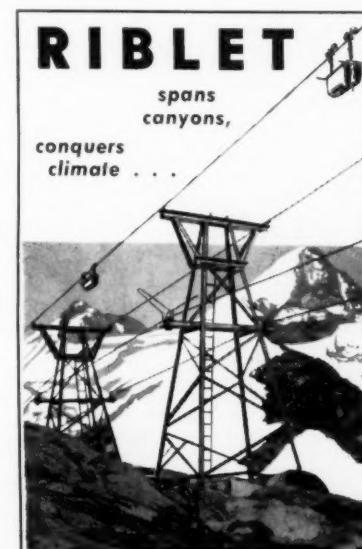
On the whole, activity in the Tunisian mining industry was relatively stable in 1957. A new and small increase in production of iron ore took place. Exports reached 1,182,180 tons, compared with 1,156,710 tons in 1956. England received 64 percent of the ore shipped from Tunisia.

The decrease in production of lead and zinc continued during the year, although some improvement is expected in 1958. Lead production was 37,180 tons compared with 38,700 tons in 1956, and zinc output totaled 6,602 tons compared with 8,870 tons in 1956.

Production of calcium phosphate showed a slight decrease—2,067,325 tons, compared with 2,076,822 in 1956. Most of this is shipped to France. Production of superphosphate was 99,255 tons, compared with 104,326 in 1956. Mercury production ceased.

## UGANDA

With the first full year's production of copper from Kilembe Mines, Limited the value of mineral production in Uganda in 1957 exceeded £1,000,000 for the first time. The value of production of the only other important mineral, wolframite, was £141,000 for the first nine months of the year. During the year the Government fixed price contracts for wolframite expired and were not renewed. The market price fell so wolframite mines were faced with the necessity for producing much higher grade ore or reducing working costs drastically. Some wolframite continued to be mined during the latter part of the year but no ore was sold at the then current prices.



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# Africa

**Comparative Value of Mineral Production in Uganda in 1954, 1955, 1956, and 1957. Expressed in Thousands of Pounds (£)**

Commodity	1954	1955	1956	1957 <sup>1</sup>
Gold	6	5	3	2
Lead (Conc.)	6	5	11	4
Salt	40	53	51	52
Wolfram Tungsten	147	112	128	141
Tin	58	49	18	30
Niobium Tantalum	24	15	4	4
Beryl	4	19	13	9
Apatite (Phosphate)	7	8	8	14
Copper (Blister)		41	1,500	
Total	292	266	277	1,756

1. Estimated.

The first full year's production of copper at Kilembe was very satisfactory, and an increase in tonnage handled is scheduled for 1958. Plans call for an extension to the milling capacity to handle 60,000 tons of ore a month.

Satisfactory results were obtained during 1957 from exploration by Unicorn Mines Ltd., to cover the extent of the lead ore zone at the Kitaka mine.

Work continues at the Sukulu Mines Limited's pilot plant and production plans now call for a minimum recovery of 400,000 tons of apatite concentrates annually. A pilot plant for the production of large scale samples of columbium concentrates is scheduled for opening in mid-1958.

## UNION OF SOUTH AFRICA

1957 gold output again set new record levels, due to the further expansion of operations by the new mines of the Free State and Klerksdorp fields, and a further improvement in the grade. The latter was derived from greater beneficiation through extended sorting and, in some cases, the mining of higher grade ore facilitated by the extension of underground operations. Most of these new mines, as well as West Driefontein and Doornfontein, have entered or are entering the second phase of productive operations in programs involving the sinking of additional hoisting and/or ventilation shafts, improving the ventilation flow otherwise (by winzes and/or refrigeration), extending stope faces, and expanding the milling rate. For the most part, development ore still constituted an abnormally high proportion of the mill feed tonnage, but this can be expected to become normalized as operations approach the projected capacity rates, with possible benefits reflected in the grade treated.

Uranium oxide output in 1957 advanced further and while there may be a levelling-off this year, a further increase is expected. With the removal of security restrictions, it was announced that the country's indicated ore reserves are 1,100,000,000 tons of ore with a content of about 370,000 tons of U<sub>3</sub>O<sub>8</sub>; equivalent to about 60 years of continuous output at the annual rate of 6,000 tons of oxide a year. Improved leaching has been effected by raising the pulp temperature in the leach-tanks while improved gold recovery has resulted from extracting the uranium oxide first, and then the gold, instead of vice versa.

Diamond output and the caratage sold declined last year but prices, especially

**Metal and Mineral Production for the Union of South Africa in 1953, 1954, 1955, 1956, and 1957\***

Commodity	1953 Production	1954 Production	1955 Production	1956 Production	1957 Production	1957 Value
Gold <sup>2</sup>	11,940,616	13,237,119	14,601,404	15,896,693	17,031,600	\$212,596,791
Diamonds <sup>3</sup>	2,717,620	2,891,264	2,628,917	2,585,728	2,578,975	14,459,745
Silver <sup>2</sup>	1,193,152	1,320,060	1,461,336	1,582,045	1,767,472	581,593
Osmiridium <sup>2</sup>	6,966	6,482	7,994	6,586	5,361	120,981
Copper <sup>1</sup>	39,844	49,134	49,239	51,253	50,959	10,234,984
Tin <sup>1,4</sup>	2,400	2,827	2,147	2,887	2,915	823,780
Antimony conc. <sup>1</sup>	4,773	16,277	24,834	24,897	17,546	845,092
Beryl ore <sup>1</sup>	513	192	137	133	111	71,135
Bismuth ore <sup>1</sup>	1	1	0.16	580	220	19,032
Chrome ore <sup>1</sup>	798,567	503,955	597,372	690,855	733,616	3,604,717
Iron ore <sup>1</sup>	2,172,346	2,060,501	2,203,429	2,275,487	2,293,103	1,492,849
Lead ore <sup>1</sup>	706	230	758	1,340	1,835 <sup>4</sup>	100,276
Manganese ore <sup>1</sup>	912,339	594,517	649,475	768,400	787,883	5,310,136
Tungsten conc. <sup>1</sup>	421	523	646	304	262	72,444
Andalusite <sup>1</sup>	11,772	14,152	19,359	30,244	17,799	71,144
Asbestos <sup>1</sup>	94,817	102,455	119,698	136,521	157,465	9,542,060
Barite <sup>1</sup>	2,092	2,058	1,892	2,713	3,369	12,706
Corundum <sup>1</sup>	1,865	1,443	834	2,068	1,546	26,823
Fluorspar <sup>1</sup>	16,029	14,262	32,839	35,065	35,106	211,790
Graphite <sup>1</sup>	413	1,164	1,829	1,862	1,750	16,101
Kaolin <sup>1</sup>	8,719	13,474	11,275	11,621	15,823	34,575
Magnesite <sup>1</sup>	25,229	22,479	19,753	33,485	35,414	67,363
Mica <sup>1</sup>	2,147	4,556	3,914	2,520	3,431	24,207
Talc <sup>1</sup>	7,974	7,413	1,581	1,968	2,314	6,835
Vermiculite <sup>1</sup>	33,544	44,006	47,904	58,717	62,619	364,824
Platinum group metals <sup>2</sup>	299,117	270,885	381,732	484,574	—	8,500,000 <sup>5</sup>
Lithium ore <sup>1</sup>	60	57	426	713	30	—
Pyrite <sup>1</sup>	103,446	236,513	398,849	481,560	434,802	1,298,662
Uranium	—	—	—	—	11,398,214	49,305,753
Monazite conc. <sup>1</sup>	—	—	—	—	—	682,879

\* Records of the Government Mining Engineer. Value does not always accurately reflect production because in one year all production may not be sold; in another year sales may include previous year's production.

1. Short tons. 2. Fine ounces. 3. Metric carats. 4. Metal and concentrate. 5. Estimated.

of gems, were more than maintained, due to continued demand and the overall inadequate output available, particularly of gems. Since the turn of the year, however, prices have eased slightly and, it is assumed, the demand also. In 1957, the De Beers group extended diamond prospecting on the Namaqualand coast, Cape Province, where about 20,000 claims were scheduled for proclamation, with extensions projected, and prospecting initiated. Operations will be conducted on a Government lease with 40 percent of the profits plus ruling taxation of the balance accruing to the State. In the Kimberley mines of the group, the decline in grade at depth has, it is understood, persisted. Block-caving methods of mining are being extended further in these mines, and the group is erecting a new treatment and recovery plant, expected to be commissioned soon.

As far as can be estimated, the recession in the platinum metal market had little effect on the overall 1957 returns. This should be reflected in the current year's figures. Last year, Rustenburg Platinum Mines sunk its fourth shaft to a depth of about 1,500 feet, part of an expansion program which was supplemented by further extensions to the treatment plant capacity to 2,600,000 from 2,200,000 tons annually, but under present conditions, the additional capacity will not be commissioned until metal market trends improve. Output will be reduced to about 60 percent of the 1956/57 figure. Subject to final signature, the Rustenburg company has increased its mining lease area by 5,166 claims.

Output by the Northwestern Cape manganese producers was maintained in 1957. Increased sales were met from accumulated stocks, and resulted from a slightly better rail transport position. Consolidation, extension of holdings, development of new mines or quarries, and the proving of additional deposits or extensions were advanced further. In the Postmasburg district, a number of small producers have been amalgamated. Domestic production of ferro-manganese was increased, and new producing units are being erected or are projected by

independent and other companies associated with the major manganese ore producers.

Projected reduction of copper output was not reflected in last year's returns and should become evident this year. Extension of copper interests was again considerable. Palabora Mining Company was formed by Newmont Mining Corporation, Rio Tinto, and the Merensky Trust to explore the extensive low-grade copper deposit extending into the property of Phosphate Development Corporation, in the Northeastern Transvaal. The Messina company extended its mineral holdings considerably in Southern Rhodesia, including copper-lead-zinc, copper, scheelite, limestone, and acquired a substantial shareholding in Rhodesian Iron and Steel Co. (Private) Ltd. The O'okiep Copper Co. announced a 10 percent reduction in copper output, and effected sales of byproduct bismuth ore. Its staff was diverted to exploration and development. Preliminary exploration was initiated on sites of ancient copper workings east of Potchefstroom, Western Transvaal. African Metals Corporation obtained encouraging results in its investigation of the Northern Transvaal Copper Company's property near Messina.

Other points of interest were the revision of its flotation plant by the Phosphate Development Corporation to phosphate ore treatment, following concentrating tests on its low-grade copper ore; additional claims acquired by Consolidated Murchison (the antimony producer) which has already secured positive results from its extensive underground exploratory development programs; small-scale production started by Minerals Engineering Company from its Marico-Zeerust vanadium deposits, and its commissioning a pilot-plant refinery at Witbank, both in the Transvaal; erection started by Umgababa Minerals of its large-scale concentrating plant on the Natal South Coast for producing ilmenite, zircon, and rutile; pilot-plant production of molybdenite concentrate by Montrose Exploration Company which also increased chromite production.

# MINING WORLD Lists

## Possible Markets—

### Ores — Metals — Non-Metallics

**—AS COMPILED FROM LISTS FURNISHED BY  
THE DIVISION OF MINERALS, U. S. BUREAU OF MINES,  
AND ORE AND METAL BUYERS**

#### ANTIMONY

American Smelting & Refining Co., 120 Broadway, New York 5, N. Y.  
Associated Metals & Minerals, 75 West St., New York 6, N. Y.  
Derby & Co., Inc., 10 Cedar St., New York 5, N. Y.  
E. A. Godoy & Co., Inc., 25 Broadway, New York 4, N. Y.  
Goldsmith Bros. Smelting & Refining Co., 1300 W. 59th Street, Chicago 36, Ill.  
Harschaw Chemical Co., 1945 E. 97th Street, Cleveland 6, Ohio  
Intercontinental Metal Corp., 607 Fifth Avenue, New York 17, N. Y.  
International Bartering Co., 52 Broadway, New York 4, N. Y.  
McGean Chemical Co., 1040 Midland Building, Cleveland 15, Ohio  
Metal & Thermic Corp., 100 E. 42nd Street, New York 17, N. Y.  
Metal Traders, Inc., 67 Wall Street, New York 5, N. Y.  
Metro Smelting Corp., Ontario & Bath Sts., Philadelphia 34, Pa.  
National Lead Corp., 111 Broadway, New York 6, N. Y.  
Philipp Brothers, Inc., 70 Pine Street, New York 5, N. Y.  
South American Mineral & Merchandising Corp., 445 Park Avenue, New York 22, N. Y.  
Southern Lead Co., 2800 W. Moreland St., Dallas, Tex.  
C. Tennant, Sons & Co., 100 Park Avenue, New York 17, N. Y.  
Nathan Trotter & Co., 36 North Front Street, Philadelphia 6, Pa.  
Wah Chang Corporation, Woolworth Building, New York 7, N. Y.  
Watson Geach & Co., 25 Broadway, New York 4, N. Y.  
Woodward & Dickerson, Inc., 1400 Penn Square, Philadelphia, Pa.

#### ASBESTOS

American Asbestos Textile Corp., Strawbridge & Sterigere Sts., Norristown, Pennsylvania  
Asbestos Textile Co., Inc., 165 W. Wacker Drive, Chicago 1, Illinois  
Asten Hill Mfg. Co., Henry & Roberts Avenue, Philadelphia, Pennsylvania  
Carolina Asbestos Co., Davidson, North Carolina  
Ehret Magnesia Mfg. Co., Valley Forge, Pennsylvania  
Garlock Packing Co., 250 Main Street, Palmyra, New York  
International Bartering Co., 52 Broadway, New York 4, N. Y.  
Johns Manville Sales Corp., 22 E. 40 Street, New York 16, New York  
Kearney & Mattison Co., Ambler, Pennsylvania  
Mundet Cork Corp., 7101 Tonelle Ave., North Bergen, New Jersey  
Pabco Products, Inc., 1550 Powell Street, Emeryville, California  
The Philip Carey Mfg. Co., 1935 Easton Blvd., Lockland, Cincinnati 15, Ohio  
The Ruheroid Co., South Bound Brook, New Jersey  
Russell Mfg. Co., Middletown, Connecticut  
Southern Asbestos Co., P. O. Box 968, Charlotte 1, North Carolina  
C. Tennant, Sons & Co., 100 Park Ave., New York 17, N. Y.  
Union Asbestos & Rubber Co., 332 South Michigan Ave., Chicago 4, Illinois  
U. S. Rubber Co., 1232 Ave. of the Americas, New York, New York  
Woodward & Dickerson, Inc., 1400 Penn Square, Philadelphia, Pa.

#### BARITE GRINDERS

##### (Possible Buyers of Crude Barite)

Acme Barite Co., Mineral Point, Mo.  
Barium Products, Ltd., P. O. Box 920, Modesto, Calif.  
Baroid Sales Division, National Lead Co., P. O. Box 1675, Houston 1, Texas  
The Glidden Co., Chemical & Pigment Division 766 50th Ave., Oaklawn 1, Calif.  
E. A. Godoy & Co., Inc., 25 Broadway, New York 4, N. Y.  
Industrial Minerals & Chemical Co., Sixth and Gilman Sts., Berkeley, Calif.  
Macco Corp., 14409 S. Paramount Blvd., Paramount, Calif.  
Magnatone Corp., P. O. Box 6504, Houston 5, Texas  
Mohr Corp., Mineral Point, Mo.  
Super Bar Co., Mineral Point, Mo.  
C. K. Williams & Co., 2001 Lynch Ave., East St. Louis, Ill.  
Woodward & Dickerson, Inc., 1400 Penn Square, Philadelphia, Pa.

##### (Possible Buyers of Crushed or Ground Barite for Use in Glass)

Anchro-Hocking Glass Co., 109 N. Broad St., Lancaster, Ohio  
Ball Bros., Ryan and Burt Sts., Muncie, Ind.  
Brockway Glass Co., Brockway, Pa.  
Buck Glass Co., Fort and Silica Sts., Baltimore, Md.  
Commercial Glass Co., Fairmont, W. Va.  
Diamond Glass Co., Royston, Pa.  
Foster-Forbes Glass Co., Marion, Ind.  
Hazel-Atlas Glass Co., 1942 Danneburg St., Wheeling, W. Va.  
A. H. Kerr & Co., Sand Springs, Okla.  
Latchford-Marble Glass Co., P. O. Box 4707, Los Angeles, Calif.  
Owens-Illinois Glass Co., Duraglass Bldg., Toledo, Ohio  
Owens-Illinois Pacific Coast Co., 135 Stockton St., San Francisco, Calif.  
Sterling Glass Co., Dapel, Ind.  
Thatcher Manufacturing Co., Elmira, N. Y.  
Woodward & Dickerson, Inc., 1400 Penn Square, Philadelphia, Pa.

##### (Possible Buyers of Ground Barite for Use in Paint)

Amalgamated Paint Co., Inc., Pier 11, North River, New York, N. Y.  
Armstrong Cork Co., 1010 Concord St., Lancaster, Pa.  
Atlantic Paint & Varnish Works, Wilmington, Del.  
Baker Paint & Varnish Co., 22 Suydam Ave., Jersey City, N. J.  
E. S. Browning Co., 1515 Third St., San Francisco, Calif.  
C. E. Butler Co., 2868 Hanna St., Oakland 8, Calif.

Clement Coverall Co., 615 Van Hook St., Camden, N. J.  
Fisher Thorsen & Co., Inc., 2100 N. W. 22nd Ave., Portland 10, Ore.  
W. P. Fuller & Co., 301 Mission St., San Francisco, Calif.  
General Paint Corp., 2627 Army St., San Francisco 19, Calif.  
U. S. Gypsum Co., 300 W. Adams St., Chicago, Ill.  
Wesco Waterpaints, Fifth and Grayson Sts., Berkeley 2, Calif.  
Woodward & Dickerson, Inc., 1400 Penn Square, Philadelphia, Pa.

##### (Possible Buyers of Crude Barite for Use in Barium Chemicals)

Barium Products Ltd., P. O. Box 920, Modesto, Calif.  
Barium Reduction Corp., Drawer 1, South Charleston, W. Va.  
Chicago Copper & Chemical Co., Blue Island, Ill.  
Mallinckrodt Chemical Works, St. Louis, Mo.  
Standard Ultramarine & Color Co., Box 2166, Huntington 18, West Va.  
Woodward & Dickerson, Inc., 1400 Penn Square, Philadelphia, Pa.

#### BENTONITE

##### (Possible Buyers of Crude and Ground)

Abbott Laboratories, North Chicago, Ill.  
American Colloid Co., Merchandise Mart Plaza, Chicago 54, Ill.  
Atlantic Refining Co., 260 S. Broad St., Philadelphia, Pa.  
Baroid Sales Div., National Lead Co., P. O. Box 1675, Houston 1, Texas  
Barnsdall Refineries, Inc., 61 E. Van Buren St., Chicago, Ill.  
Bradford Oil Refining Co., Bradford, Pa.  
Cities Service Refining Co., Boston, Mass.  
Commercial Minerals Co., San Francisco, Calif.  
Charles B. Crystal Co., Inc., 53 Park Place, New York, N. Y.  
Eastern Clay Products, Inc., 223½ Main St., Jackson, Ohio  
Filtrol Corp., 634 So. Spring St., Los Angeles 14, Calif.  
Great Lakes Foundry Sales Co., 700 United Artists Bldg., Detroit, Mich.  
Gulf Refining Co., 260 S. Broad St., Phila., Pa.  
Hammer & Gillespie, Inc., 225 Broadway, New York 7, N. Y.  
Harriss Chemical Co., 47 Ann St., New York 7, N. Y.  
Pur-Oil Co., 35 E. Wacker Dr., Chicago, Ill.  
Quaker State Oil Corp., Enid, Okla.  
Ranger Chemical Corp., P. O. Box 1765, Houston 1, Texas  
Richfield Oil Corp. of New York, Chanin Bldg., New York, N. Y.  
United Clay Mines Corp., 109 Oakland St., Trenton, N. J.  
Western Clay and Metals Co., 1 So. 2nd St., Alabama, Calif.  
Western Clay Products Co., P. O. Box 231, Houston, Texas  
Western Tale Co., 100 E. Slauson Ave., Los Angeles 11, Calif.  
Witco Chemical Co., 17 Ann St., New York 7, N. Y.

#### BERYL

Beryllium Corp., P. O. Box 1462, Reading, Pa.  
Beryl Ores Co., P. O. Box 409, Rouse 1, Arvada, Colo.  
Brush Beryllium Co., 4301 Perkins Ave., Cleveland 3, Ohio  
Derby and Co., Inc., 1 Ceder St., New York 5, N. Y.  
Foots Mineral Co., 18 W. Chelten Ave., Philadelphia 4, Pa.  
J. E. De Soma Co., Inc., 217 Broadway, New York 7, N. Y.  
E. A. Godoy & Co., Inc., 25 Broadway, New York 4, N. Y.  
International Bartering Co., 52 Broadway, New York 4, N. Y.  
Metallurg Inc., 100 Park Ave., New York 17, N. Y.  
Phillip Bros., Inc., 70 Pine St., New York 5, N. Y.  
Frank Samuel and Co., Inc., Lincoln Liberty Bldg., Philadelphia 7, Pa.  
A. O. Smith Corp., 3533 N. 27th St., Milwaukee 16, Wis.  
C. Tennant, Sons & Co., 100 Park Ave., New York 17, N. Y.  
Woodward & Dickerson, Inc., 1400 Penn Square, Philadelphia, Pa.

Note: Domestic beryl is also purchased at Government buying depots at Custer, S. Dak., Franklin, N. H., and Spruce Pine, N. C.

#### BISMUTH

##### (Metal)

American Metal Co., Ltd., 61 Broadway, New York 6, N. Y.  
American Smelting and Refining Co., 120 Broadway, New York 5, N. Y.  
The Anaconda Co., 25 Broadway, New York 4, N. Y.  
Associated Metals & Minerals Corp., 75 West St., New York 6, N. Y.  
J. T. Baker Chemical Co., Phillipsburg, N. J.  
Belmont Smelting & Refining Works, Inc., 330 Belmont Ave., Brooklyn, N. Y.

Cerro de Pasco Corp., 300 Park Ave., New York 22, N. Y.

International Bartering Co., 52 Broadway, New York 4, N. Y.

Mallinckrodt Chemical Works, 2nd & Mallinckrodt Streets, St. Louis 7, Mo.

Merck & Co. Inc., Rahway, N. J.

National Lead Co., 111 Broadway, New York 6, N. Y.

Norwich Pharmacal Co., 17 Eaton Avenue, Norwich, N. Y.

Charles Pfizer & Co., Inc., 11 Bartlett Street, Brooklyn 6, N. Y.

U. S. Metals Refining Co., 61 Broadway, New York 6, N. Y.

U. S. Smelting Refining & Mining Co., 75 Federal St., Boston 6, Mass.

#### CADMIUM

American Metal Co., Ltd., 61 Broadway, New York 6, N. Y.

American Smelting and Refining Co., 120 Broadway, New York 5, N. Y.

American Zinc, Lead and Smelting Co., 1600 Paul Brown Bldg., St. Louis, Mo.

The Anaconda Co., 25 Broadway, New York, N. Y.

Associated Metals & Minerals Corp., 75 West St., New York 6, N. Y.  
 The Bunker Hill Co., Kellogg, Idaho  
 Chemical and Pigment Co. (Div. of the Glidden Co.), 2701 Broening Highway, Baltimore 22, Maryland.  
 Eagle Picher Co., (Mining and Smelting Div.), P. O. Box 910, Miami, Okla.  
 Harshaw Chemical Co., 1945 E. 97th St., Cleveland 6, Ohio.  
 International Bartering Co., 52 Broadway, New York 4, N. Y.  
 International Minerals and Metals Corp., 11 Broadway, New York 6, N. Y.  
 International Smelting and Refining Co., International Utah.  
 New Jersey Zinc Co., 160 Front St., New York 38, N. Y.  
 Sherwin-Williams Co., Ozark Smelting & Mining Div., 101 Prospect Av., N.W., Cleveland 1, Ohio.  
 C. Tennant, Sons & Co., 100 Park Ave., New York 17, N. Y.

#### CHROME ORE

##### (Metallurgical Ore Users)

Associated Metals & Minerals Corp., 75 West St., New York 6, N. Y.  
 Baltimore Works, Armco Steel Corp., 3400 E. Chase St., Baltimore 13, Md.  
 Electro-Metallurgical Corp., 30 E. 42nd St., New York 17, N. Y.  
 E. A. Godoy & Co., Inc., 25 Broadway, New York 4, N. Y.  
 International Bartering Co., 52 Broadway, New York 4, N. Y.  
 Keokuk Electro-Metals Co., Keokuk, Iowa.  
 Montana Ferraalloys, Inc., P. O. Box 1100, Memphis, Tenn.  
 Ohio Ferro-Alloys Corp., 839 30th St., N.W., Canton 9, Ohio  
 Pacific Northwest Alloys, Inc., P. O. Box 6247, Hillyard Station, Spokane, Wash.  
 Pittsburgh Metallurgical Co., Niagara Falls, N. Y.  
 C. Tennant, Sons & Co., 100 Park Ave., New York 17, N. Y.  
 Tennessee Products & Chemical Corp., 500 First American National Bank Bldg., Nashville 3, Tenn.  
 Universal Cyclops Steel Corp., Bridgeville, Pa.  
 Vanadium Corporation of America, 420 Lexington Ave., New York 17, N. Y.  
 Woodward & Dickerson, Inc., 1400 Penn Square, Philadelphia, Pa.

##### (Chemical Ore Users)

Columbia-Southern Chemical Corp., 902 Garfield Ave., Jersey City 5, N. J.  
 Diamond Alkali Co., 300 Union Commerce Bldg., Cleveland 14, Ohio  
 Diamond Alkali Co.-Kearny Plant, Belleville Turnpike, Kearny, N. J.  
 Foote Mineral Co., Inc., 10 E. Chelten Ave., Philadelphia 44, Pa.  
 E. A. Godoy & Co., Inc., 25 Broadway, New York 4, N. Y.  
 Imperial Paper & Color Corp., Glen Falls, N. Y.  
 International Bartering Co., 52 Broadway, New York 4, N. Y.  
 Mutual Chemical Div. Allied Chemical & Dye Corp., 99 Park Ave., New York 16, N. Y.  
 Frank Samuel & Co., Inc., Lincoln-Liberty Bldg., Philadelphia 7, Pa.  
 Solvay Process Div., Allied Chemical & Dye Corp., P.O. Box 271, Syracuse, N. Y.

#### (Refractory Ore Users)

Basic Refractories, Inc., 845 Hanna Bldg., Cleveland 15, Ohio  
 Eastern Stainless Steel Corp., Baltimore 3, Md.  
 General Refractories Co., 1520 Locust St., Philadelphia, Pa.  
 E. A. Godoy & Co., Inc., 25 Broadway, New York 4, N. Y.  
 Harbison-Walker Refractories Co., Farmers Bank Bldg., Pittsburgh 22, Pa.  
 International Bartering Co., 52 Broadway, New York 4, N. Y.  
 Kaiser Aluminum & Chemical Corp., 1924 Broadway, Oakland 12, Calif.  
 E. J. Laino & Co., 3 Penn Center Plaza, Philadelphia 2, Pa.  
 Frank Samuel & Co., Inc., Lincoln-Liberty Bldg., Philadelphia 7, Pa.  
 U. S. Steel Corp., 525 William Penn Place, Pittsburgh 30, Pa.  
 Woodward & Dickerson, Inc., 1400 Penn Square, Philadelphia, Pa.

#### COBALT

Ceramic Color & Chemical Mfg. Co., New Brighton, Pa.  
 Harshaw Chemical Co., 1945 East 97th St., Cleveland 6, Ohio.  
 International Bartering Co., 52 Broadway, New York 4, N. Y.  
 Kennametal, Inc., Latrobe, Pa.  
 Metallurgical Resources, Inc., Newburgh, N. Y.  
 The Pyrites Co., Wilmington, Del.  
 The O. Hommel Co., Carnegie, Pa.  
 Shepherd Chemical Co., Highland Avenue, Cincinnati 12, Ohio.

#### COLUMBITE-TANTALITE

African Metals Corp., 25 Broad St., New York 4, N. Y.  
 J. E. De Souza Co., Inc., 217 Broadway, New York 7, N. Y.  
 Derby & Co., 10 Cedar St., New York 5, N. Y.  
 Electro Metallurgical Division of Union Carbide and Carbon Corp., 38 E. 42nd St., New York 17, N. Y.  
 Fansteel Metallurgical Corp., N. Chicago, Ill.  
 Foote Mineral Co., 14 W. Chelten Ave., Philadelphia 44, Pa.  
 International Bartering Co., 52 Broadway, New York 4, N. Y.  
 Kennametal, Inc., Latrobe, Pa.  
 Kawecki Chemical Co., Boyertown, Pa.  
 Mallinckrodt Chemical Works, 2nd & Mallinckrodt St., St. Louis 7, Mo.  
 Metal Hydrides, Inc., 12-21 Congress St., Beverly, Mass.  
 Standard Ore & Alloys Corp., 120 Wall St., New York 5, N. Y.  
 C. Tennant, Sons & Co., 100 Park Ave., New York 17, N. Y.  
 Wah Chang Corp., Woolworth Bldg., New York 7, N. Y.  
 Woodward & Dickerson, Inc., 1400 Penn Square, Philadelphia, Pa.

#### COPPER

American Metal Co., Ltd., Carteret, N. J.  
 American Smelting & Refining Co., El Paso, Tex., Garfield, Utah, Hayden, Ariz., Tacoma, Wash.  
 The Anaconda Co., Anaconda, Mont.  
 Associated Metals & Minerals Corp., 75 West St., New York 6, N. Y.  
 E. A. Godoy & Co., Inc., 25 Broadway, New York 4, N. Y.  
 Inspiration Consolidated Copper Co., Inspiration, Ariz.  
 International Bartering Co., 52 Broadway, New York 4, N. Y.  
 International Minerals & Metals Corp., 11 Broadway, New York 6, N. Y.  
 International Smelting & Refining Co., Miami, Ariz.  
 Magma Copper Co., Superior, Ariz.

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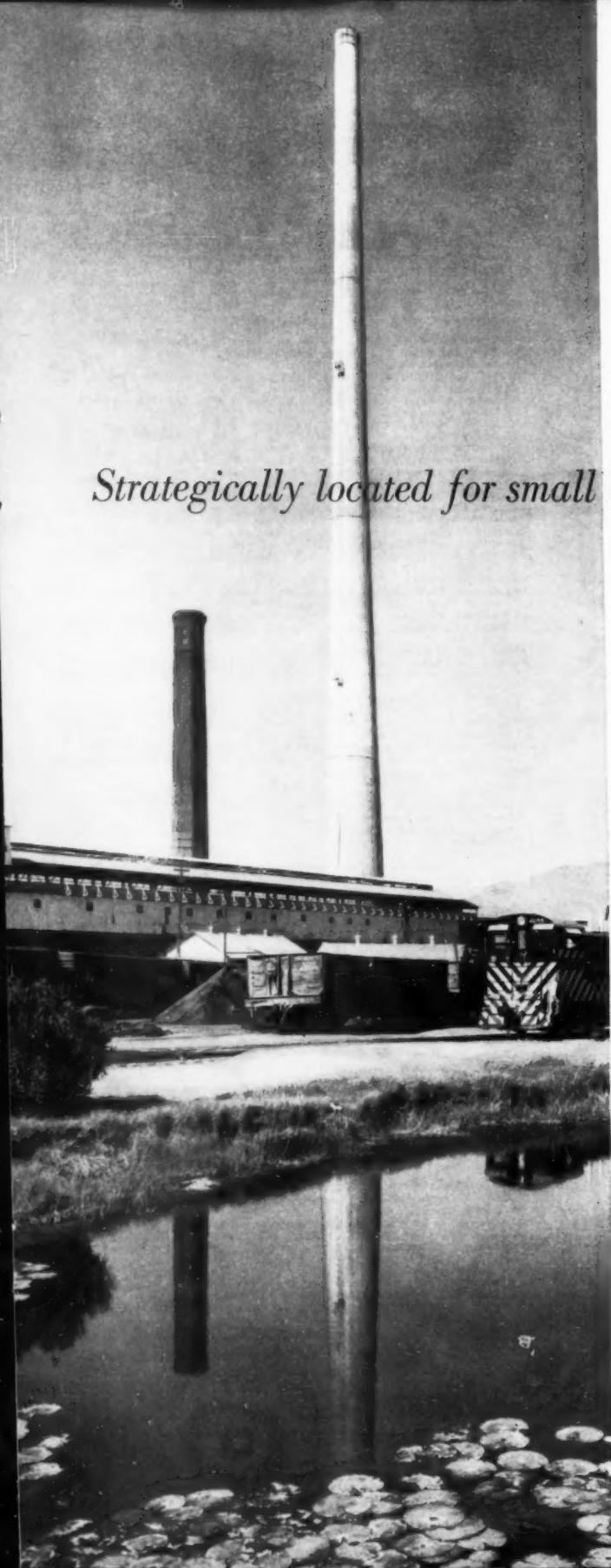
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**American Smelting and  
Refining Company,  
Ore Purchasing Department,  
120 Broadway,  
New York 5, N. Y.**

ASARCO

Phelps Dodge Refining Corp., Laurel Hill, N. Y.  
Phelps Dodge Corp., Douglas, Ariz., Morenci, Ariz., Ajo, Ariz.  
C. Tennant, Sons & Co., 100 Park Ave., New York 17, N. Y.  
Tennessee Copper Co., Copperhill, Tenn.

#### DIATOMITE

American Cyanamid Co., 39 Rockefeller Plaza, New York, N. Y.  
A. Daigeler & Co., 161 West Kinzie St., Chicago, Ill.  
General Refractories Co., 1518 Locust St., Philadelphia, Pa.  
B. F. Goodrich Co., 8 S. Main St., Akron, Ohio  
Hygeia Filter Co., 3422 Dearborn St., Detroit, Michigan.  
Industrial Minerals & Chemical Co., 836-38 Gilman St., Berkeley, Calif.  
Marshall Dill Division, WhitCo Chemical Co., 30 Bluxome St., San Francisco, Calif.  
National Filter Media Co., Sales Div. of Filter Media Corp., 1719 Dixwell Ave., New Haven, Conn.  
Standard Asbestos Mfg. & Insulating Co., 410 Olive St., Kansas City, Mo.

#### FELDSPAR

##### (Possible Buyers of Crude, Crushed, or Ground)

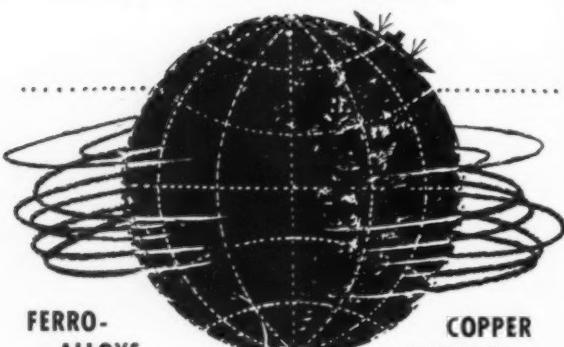
Akron Porcelain Co., Kenmore Station, Akron, Ohio  
Ball Brothers Co., Muncie, Ind.  
Corning Glass Works Co., 1943 Crystal St., Corning, N. Y.  
Donnelly-Kelley Glass Co., 49 Fenlon St., Holland, Mich.  
Federal Glass Co., Columbus, Ohio  
General Ceramics Co., 39 Rockefeller Plaza, New York, N. Y.  
Hazard Atlas Co., 1942 Danielberg St., Wheeling, W. Va.  
Knox Porcelain Corp., 158 Mynderse St., Knoxville, Tenn.  
Marrett Mfg. Corp., 4000 E. 15th St., Indianapolis, Ind.  
Owens-Illinois Glass Co., Toledo, Ohio  
Porcelain Products Co., Inc., 1941 Broadway, Parkersburg, W. Va.  
Star Porcelain Co., Murhead & Dewey Aves., Trenton, N. J.  
C. Tennant, Sons & Co., 100 Park Ave., New York 17, N. Y.  
Trenton Potteries Co., Inc., Trenton, N. J.  
Wellsville China Co., Wellsville, Ohio

#### FLUORSPAR

##### (Brokers or Selling Agents)

Associated Metals & Minerals Corp., 75 West St., New York 6, N. Y.  
Balfour, Guthrie & Co., Los Angeles, Calif.  
Bauer-Wilson & Bateman, 138 S. LaSalle St., Chicago, Ill.  
Continental Ore Co., 50 Fifth Ave., New York City.  
E. I. du Pont de Nemours & Co., 1807 Market St., Wilmington, Del.  
Foote Mineral Co., 18 W. Chelten Ave., Philadelphia 44, Pa.  
E. A. Godoy & Co., Inc., 25 Broadway, New York 4, N. Y.  
Hickman, Williams & Co., Clark Blvd., Pittsburgh, Pa.  
Ketchum, Marshall & Co., Oliver Bldg., Pittsburgh, Pa.  
E. J. Lavine & Co., 1524 Walnut St., Philadelphia, Pa.  
Mercantile Import & Export Corp., 21 East 40th St., New York City.  
Mercantile Metal & Ore Corp., 66 Wall St., New York City.  
Miller-Adick Co., Carew Tower, Cincinnati, O.  
Orlebar Norton & Co., Hanna Bldg., Cleveland, O.  
Woodward & Dickerson, Inc., 1400 Penn Square, Philadelphia, Pa.

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#### GERMANIUM

American Smelting & Refining Co., 120 Broadway, New York 5, N. Y.  
The American Steel and Wire Div., United States Steel Corp., Rockefeller Bldg., Cleveland 13, Ohio.  
American Zinc, Lead and Smelting Co., 818 Olive St., St. Louis, Mo.  
Eagle Picher Co., Mining and Smelting Div., First Nat. Bank Bldg., Miami, Okla.  
Sylvania Electric Products, Inc., Towanda, Pa.

#### GRAPHITE

The Asbury Graphite Mills, Inc., 41 Main St., Asbury, N. J.  
Cummings-Moore Graphite Co., 1646 Green Ave., Detroit 9, Mich.  
Joseph Dixon Crucible Co., 167 Wayne St., Jersey City 3, N. J.  
Charles Pettino, Inc., 1 E. 42nd St., New York 17, N. Y.  
Superior Graphite Co., 33 S. Clark St., Chicago 3, Ill.  
United States Graphite Co., 1621 Holland Ave., Saginaw, Mich.

#### IRON ORE

Acme Steel Co., Newport, Kentucky.  
Alan Wood Steel Co., Conshohocken, Pa.  
Armcro Steel Corp., Middletown, Ohio.  
Associated Metals & Minerals Corp., 75 West St., New York 6, N. Y.  
Bethlehem Steel Company, Bethlehem, Pa.  
Columbia-Geneva Steel Div., U. S. Steel Corp., 120 Montgomery, San Francisco, Calif.  
Colorado Fuel & Iron Corp., Pueblo, Colorado.  
Crucible Steel Co. of America, P. O. Box 88, Pittsburgh 30, Pa.  
Detroit Steel Corp., Port Huron, Ohio.  
Eastern Gas & Fuel Assoc., 250 Stuart St., Boston, Mass.  
Ford Motor Co., 3000 Schaefer Road, Dearborn, Mich.  
E. A. Godoy & Co., Inc., 25 Broadway, New York 4, N. Y.  
Granite City Steel Co., Box 367, Granite City, Ill.  
Hanna Furnace Corp., Grant Bldg., Pittsburgh, Pa.  
Inland Steel Co., 3210 Watling St., E. Chicago, Indiana.  
Interlake Iron Corp., 1900 Union Commerce Bldg., Cleveland 14, Ohio.  
International Harvester Co., 180 No. Michigan Ave., Chicago 1, Ill.  
Jones & Laughlin Steel Corp., 401 Liberty Ave., Gateway Center, Pittsburgh 38, Pa.  
Kaiser Steel Corp., P. O. Box 217, Fontana, Calif.  
Lone Star Steel Co., P. O. Box 8087, Dallas 5, Tex.  
National Steel Corp., Grant Bldg., Pittsburgh, Pa.  
Pittsburgh Steel Co., Grant Bldg., Pittsburgh, Pa.  
Republic Steel Corp., Republic Bldg., 25 Prospect Ave., N. W. Cleveland 1, Ohio.  
Sharon Steel Corp., Sharon, Pa.  
Shenango Furnace Co., Oliver Bldg., Pittsburgh, Pa.  
Tennessee Coal & Iron Div., U. S. Steel Corp., P. O. Box 599, Fairfield, Ala.  
U. S. Pipe & Foundry Co., Birmingham, Ala.  
U. S. Steel Corp., 525 Wm. Penn Place, Pittsburgh 30, Pa.  
Wheeling Steel Corp., Wheeling, West Virginia.  
Woodward Iron Company, Woodward, Ala.  
Woodward & Dickerson, Inc., 1400 Penn Square, Philadelphia, Pa.  
Youngstown Sheet & Tube Co., Stambaugh Bldg., Youngstown 1, Ohio.

#### LEAD

Associated Metals & Minerals Corp., 75 West St., New York 6, N. Y.  
American Metal Company, Ltd., 61 Broadway, New York 6, N. Y.  
American Smelting & Refining Co., 120 Broadway, New York 5, N. Y.  
The Bunker Hill Co., Kellogg, Idaho.  
Combined Metals Reduction Co., Felt Bldg., Salt Lake City, Utah.  
The Consolidated Mining & Smelting Co., Ltd., Montreal, Canada.  
Eagle Picher Co., Mining and Smelting Div., P. O. Box 910, Miami, Oklahoma.  
E. A. Godoy & Co., Inc., 25 Broadway, New York 4, N. Y.  
International Bartering Co., 52 Broadway, New York 4, N. Y.  
International Smelting & Refining Co., 25 Broadway, New York 4, N. Y.  
Metal Traders, Inc., 67 Wall St., New York, N. Y.  
National Lead Company, 111 Broadway, New York, N. Y.  
Philippe Brothers, Inc., 70 Pine St., New York 5, N. Y.  
St. Joseph Lead Co., 250 Park Ave., New York 17, N. Y.  
C. Tennant, Sons & Co., 100 Park Ave., New York 17, N. Y.  
United States Smelting Refining & Mining Co., 75 Federal St., Boston, Mass.  
Woodward & Dickerson, Inc., 1400 Penn Square, Philadelphia, Pa.

#### LEPIDOLITE

American Potash & Chemical Corp., 3030 W. 6th St., Los Angeles 51, Calif.  
Corning Glass Works, Corning, N. Y.  
J. E. De Souza Co., Inc., 217 Broadway, New York 7, N. Y.  
General Electric Co., Nela Park, Cleveland, Ohio.  
Foote Mineral Co., 18 W. Chelten Ave., Philadelphia 44, Pa.  
Pittsburgh Corning Corp., Port Allegany, Pa.

#### MAGNESITE AND BRUCITE

Basic, Inc., 845 Hanna Bldg., Cleveland 15, Ohio.  
Corhart Refractories Co., (Corning Glass Works), 1662 West Lee St., Louisville, Ky.  
E. A. Godoy & Co., Inc., 25 Broadway, New York 4, N. Y.  
Kaiser Aluminum & Chemical Corp., 1924 Broadway, Oakland, Calif.  
Northwest Magnesite Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.  
Pabco Products Inc., 1550 Powell St., Emeryville 8, Calif.  
Standard Lime & Cement Co., 2000 First National Bank Bldg., Baltimore, Md.  
Standard Oil Co., 1200 Wick Bldg., Youngstown 1, Ohio.  
Westvaco Chemical Division, Food Machinery & Chemical Corp., 161 E. 47th St., New York, N. Y.

#### MANGANESE ORE

##### (Metallurgical-grade)

Associated Metal & Minerals Corp., 75 West St., New York 6, N. Y.  
Bethlehem Steel Co., Bethlehem, Pa.  
Colorado Fuel and Iron Corp., Pueblo, Colorado.  
Electro Manganese Div., Foote Mineral Co., Knoxville, Tenn.  
Electro Metallurgical Co., A Division of Union Carbide and Carbon Corp., 30 E. 42nd St., New York 17, N. Y.  
E. A. Godoy & Co., Inc., 25 Broadway, New York 4, N. Y.  
Keokuk Electro Metals Co., Keokuk, Iowa.  
National Paint and Manganese Co., Lynchburg, Virginia.  
Ohio Ferro-Alloys Corp., 100 Citizens Bldg., Canton, Ohio.

Pittsburgh Metallurgical Co., Niagara Falls, New York.  
 C. Tennant Sons & Co., 109 Park Ave., New York 17, N. Y.  
 Tennessee Products and Chemical Corp., American National Bank Bldg.,  
 Nashville, Tennessee.  
 Tex-Tex Alum. and Chemical Corp., 500 1st American National Bank  
 Bldg., Nashville 3, Tenn.  
 United States Steel Co., 525 William Penn Place, Pittsburgh 30, Pa.  
 Woodward & Dickerson, Inc., 1400 Penn Square, Philadelphia, Pa.

**(Battery and Chemical-grade)**

Acme Battery Co., 200 Henry St., Stamford, Conn.  
 Burgess Battery Company, Freeport, Ill.  
 Foote Mineral Co., 18 W. Chestnut Ave., Philadelphia 44, Pa.  
 General Dry Batteries, Inc., Cleveland, Ohio.  
 General Electric Co., Neil Park, Cleveland, Ohio.  
 E. A. Godoy & Co., Inc., 25 Broadway, New York 4, N. Y.  
 E. J. Lavino & Co., 3 Penn Center Plaza, Philadelphia 2, Pa.  
 Mallory Battery Co., Div. of P. R. Mallory & Co., Inc., 13000 Athens  
 Ave., Cleveland, Ohio.  
 National Carbon Co., P. O. Box 6087, Cleveland, Ohio.  
 Olin Mathieson Chemical Corp., 225 Winchester Ave., New Haven 4,  
 Conn.  
 Ray-O-Vac Co., Madison, Wis.  
 Tennessee Eastman Corp., Kingsport, Tenn.

**MERCURY**

Allied Chemical & Dye Corp., The Solvay Process Div., P. O. Box 271,  
 Syracuse, N. Y.  
 American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y.  
 American Meter Co., Erie, Pa.  
 Automatic Steel Products, Inc., Mercury Clutch Div., 1201 Camden Ave.,  
 S. W., Canton 6, Ohio.  
 Associated Metals & Minerals Corp., 75 West St., New York 6, N. Y.  
 Bailey Meter Co., 1052 Ivanhoe Rd., Cleveland 10, Ohio.  
 J. T. Baker Chemical Co., Phillipsburg, N. J.  
 F. W. Berk & Co., Inc., Woodbridge Div., Box 38, Woodbridge, N. J.;  
 Coast Chem. Div., 275 Brannon St., San Francisco, Calif.  
 E. I. du Pont de Nemours & Co., Inc., Methods Div., Du Pont Bldg.,  
 Wilmington 98, Del.  
 Foxboro Co., Foxboro, Mass.  
 General Aniline & Film Corp., General Aniline Works Div., 435 Hudson  
 St., New York 14, N. Y.  
 General Color Co., 24 Avenue B, Newark 5, N. J.  
 General Electric Co., Purchasing Dept., 1 River Road, Schenectady 5,  
 N. Y.  
 International Bartering Co., 52 Broadway, New York 4, N. Y.  
 International Minerals & Metals Corp., 11 Broadway, New York 6, N. Y.  
 Mallinckrodt Chemical Works, Jersey City 5, N. J.  
 Mathieson Chemical Co., Baltimore, Md.  
 Merck & Co., Inc., Lincoln Ave., Rahway, N. J.  
 The Merck Corp., 4281 Belmont Ave., Chicago 41, Ill.  
 Metalsalt Corp., 200 Wagaray Rd., Hawthorne, N. J.  
 Minneapolis Honeywell Regulator Co., 2753 4th Ave. S., Minneapolis 8,  
 Minn.; Brown Instrument Div., 4331 Wayne Ave., Philadelphia, Pa.  
 Phillips Petroleum Co., Bartlesville, Okla.  
 Public Service Electric & Gas Co., Electric Dept., 80 Park Place,  
 Newark 1, N. J.  
 Quicksilver Products Inc., 407 Sansome St., San Francisco 11, Calif.  
 Thomas A. Edison, Inc., Primary Battery Div., Bloomfield, N. J.  
 Westinghouse Electric Corp., 306 Fourth Ave., Pittsburgh 30, N. J.  
 Woodward & Dickerson, Inc., 1400 Penn Square, Philadelphia, Pa.  
 Wyandotte Chemical Corp., Wyandotte, Mich.

**MICA**

**(Buyers of Muscovite Block, Film Mica, and Phlogopite  
 Block Mica)**

Aerovox Division, Aerovox Corp., 710 Belleville Ave., New Bedford,  
 Mass.  
 American Mica Insulation Co., 235 Parker Ave., Manasquan, N. J.  
 Ashville Mica Co., P. O. Box 318, Newport News, Va.  
 Carpenter & Phillips, Box 657, Spruce Pine, N. C.  
 Cornell-Dubilier Electric Corp., 55 Cromwell St., Providence 7, R. I.  
 Diamond Power Specialty Corp., P. O. Box 415, Lancaster, Ohio.  
 J. E. DeSousa Co., Inc., 217 Broadway, New York 7, N. Y.  
 Farnam Mfg. Inc., Sweeten Creek Road, Asheville, N. C.  
 General Electric Co., 1 River Road, Schenectady, N. Y.  
 E. A. Godoy & Co., Inc., 25 Broadway, New York 4, N. Y.  
 Mica Fabricating Company, 53 Central Ave., Rochelle Park, N. J.  
 Microcraft Products, Inc., 701 McCarter Highway, Newark 5, N. J.  
 Perfection Mica Co., 28 North Wacker Drive, Chicago, Ill.  
 Reliance Mica Co., 341 39th St., Brooklyn, N. Y.  
 Spruce Pine Mica Co. and Mayland Mfg. Co., Spruce Pine, N. C.  
 The Tar Heel Mica Co., Inc., Plumtree, N. C.  
 Western Electric Co., Inc., 195 Broadway, New York 7, N. Y.  
 Woodward & Dickerson, Inc., 1400 Penn Square, Philadelphia, Pa.

**(Consumers of Mica Splittings)**

Allis-Chalmers Manufacturing Co., Box 512 Milwaukee 1, Wisconsin.  
 American Electrical Heater Co., 6110 Cass Ave., Detroit, Michigan.  
 Cleveland Mica Co., 1360 Hird St., Lakewood, Ohio.  
 Continental-Diamond Fibre Co., Valparaiso, Indiana.  
 General Electric Co., 1 River Road, Schenectady, N. Y.  
 Mica Insulator Company, 757 Broadway, Schenectady, New York.  
 National Electric Coil Co., Columbus, Ohio.  
 Westinghouse Electric Corp., P.O. Box 472, Irwin, Pa.

**MICA GRINDERS**

**(Buyers of Domestic Scrap Mica)**

Concord Mica Corp., 25 Crescent St., Penacook, N. H.—Wet.  
 International Minerals & Chemical Corp., 29 North Wacker Drive, Chi-  
 cago, Ill.; plants at Kona, N. C., and Erwin, Tenn.  
 Denes Mica Co., Burnsville, N. C.—Dry.  
 Diamond Mica Co., Spruce Pine, N. C.—Wet and Dry.  
 English Mica Co., Spruce Pine, N. C.—Wet and Dry.  
 Franklin Mineral Products Co., Box 38, Franklin, N. C.—Wet.  
 The Funkhouse Co., Hartwell, Georgia—Dry.  
 John Humer, Winterhaven, Calif.  
 Kings Mountain Mica Co., Inc., Box 709, Kings Mountain, N. C.—Dry.  
 Southern Mica Co., Johnson City, Tenn.—Dry.  
 Sunshine Mica Co., 12234 Los Nietos Road, Los Nietos, Calif.  
 Western Nonmetallics, Inc., Pueblo, Colo.—Dry.

**MOLYBDENUM CONCENTRATES**

J. T. Baker Chemical Co., Phillipsburg, N. J.  
 Climax Molybdenum Co., 500 Fifth Ave., New York, N. Y.  
 Crucible Steel Co. of America, Pittsburgh, Pa.  
 International Minerals & Metals Corp., 11 Broadway, New York 6, N. Y.  
 Molybdenum Corp. of America, 500 Fifth Ave., New York, N. Y.  
 Republic Steel Corp., Canton, Ohio.  
 S. W. Shattuck Chemical Co., Denver, Colo.  
 Woodward & Dickerson, Inc., 1400 Penn Square, Philadelphia, Pa.

**NICKEL**

American Smelting & Refining Co., 120 Broadway, New York 5, N. Y.  
 Cosmo Metal Alloys Co., 275 Front St., New York, N. Y.  
 Sulmet Alloys Co., Inc., Wellington St. and Erie R.R., Clifton, N. J.  
 C. Tennant, Sons & Co., 100 Park Ave., New York 17, N. Y.  
 United States Smelting Refining & Mining Co., 1 State St., Boston,  
 Mass.

Woodward & Dickerson, Inc., 1400 Penn Square, Philadelphia, Pa.

**PERLITE**

**(Producers of Expanded Perlite)**

Airlite Processing Corp., Bldg. 9, Air Base, Vero Beach, Fla.  
 American Bildrok Co., 2001 W. Pershing Road, Chicago 9, Ill.  
 Alatex Construction Service, Inc., 3518 Broadway St., New Orleans 18,  
 La.  
 Buffalo Perlite Corp., 100 Sugg Road (Cheektowaga), Buffalo 21, N. Y.  
 Florida Perlite Co., 285 West 9th St., Miami, Fla.  
 Great Lakes Carbon Corp., 612 Flower St., Los Angeles 17, Calif.  
 Great Products Co., 618 Chestnut St. S. W., Grand Rapids, Mich.  
 Harborlite Corp., 696 Montgomery Freeway, Chula Vista, Calif.  
 McClure & Erickson Corp., 2416 Beddeson Ave., Los Angeles 22, Calif.  
 Midwest Perlite Products, Inc., 1126 Railroad St., W. Des Moines, Iowa.  
 Minerals Processing Corp., 520 Van Rensselaer St., Syracuse, N. Y.  
 Minnesota Perlite Corp., 315 W. 86th St., Minneapolis 20, Minn.  
 National Gypsum Co., 325 Delaware Ave., Buffalo 2, N. Y.  
 Panacalite Pacific, Inc., 845 E. 60th St., Los Angeles 1, Calif.  
 Paramount Perlite Co., 16236 S. Illinois St., Paramount, Calif.  
 Supreme Perlite Co., P.O. Box 66, North Portland, Oregon  
 Silbrico Corp., 5901 W. 65th St., Chicago 36, Ill.

**PLATINUM**

The American Platinum Works, 231 New Jersey R. R. Ave., Newark 5,  
 N. J.  
 Baker & Co., Inc., 113 Astor St., Newark 5, N. J.  
 J. Bishop & Co. Platinum Works, Malvern, Pa.  
 Handy & Harman, 82 Fulton St., New York 7, N. Y.  
 Johnson, Matthey & Co., Inc., 608 Fifth Ave., New York 20, N. Y.  
 Mercantile Metal & Ore Corp., 595 Madison Ave., New York 22, N. Y.  
 Rodman & Yaruss Refining Co., 21 W. 47th St., New York 19, N. Y.  
 Wildberg Bros. Smelting & Refining Co., 742 Market St., San Fran-  
 cisco 2, Calif.  
 Western Gold & Platinum Works, 589 Bryant St., San Francisco 7,  
 Calif.

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OTHER MINOR AND RARE ORES

#### PYRITE

American Smelting & Refining Co., 120 Broadway, New York 5, N. Y.  
 The Anaconda Co., 25 Broadway, New York 4, N. Y.  
 Associated Metals & Minerals Corp., 75 West St., New York 6, N. Y.  
 Baugh Chemical Company, Baltimore, Maryland.  
 Davidson Chemical Corporation, 20 Hopkins Place, Baltimore 3, Maryland.  
 Foote Mineral Company, 18 West Chelten Ave., Philadelphia 44, Pa.  
 General Chemical Division, Allied Chemical & Dye Corp., P. O. Box 4040, Denver, Colorado.  
 E. A. Godoy & Co., Inc., 25 Broadway, New York 4, N. Y.  
 Reliance Phosphate Company, Savannah, Georgia.  
 Stauffer Chemical Company, 636 California St., San Francisco 8, Calif.  
 C. Tennant, Sons & Co., 100 Park Ave., New York 17, N. Y.  
 Woodward & Dickerson, Inc., 1400 Penn Square, Philadelphia, Pa.

#### RARE-EARTH ORES

(Cerium ores, monazite sand, bastnasite, other thorium-bearing ores)

Crane Co., 836 Michigan Ave., Chicago 5, Ill.  
 Davison Chemical Co., Rare Earths Div., P. O. Box 488, Pompton Plains, N. J.  
 J. E. De Souza Co., Inc., 217 Broadway, New York 7, N. Y.  
 E. A. Godoy & Co., Inc., 25 Broadway, New York 4, N. Y.  
 Lindsay Chemical Co., 264 Ann St., West Chicago, Illinois.  
 Mallinckrodt Chemical Works, 2nd and Mallinckrodt Sts., St. Louis 7, Mo.  
 Maywood Chemical Works, Maywood, N. J.  
 Molybdenum Corp. of America, 500 Fifth Ave., New York, N. Y.  
 C. Tennant, Sons & Co., 100 Park Ave., New York 17, N. Y.

#### SELENIUM

American Metal Co., Ltd., 61 Broadway, New York, N. Y.  
 American Smelting & Refining Co., 120 Broadway, New York 4, N. Y.  
 International Bartering Co., 52 Broadway, New York 4, N. Y.  
 International Smelting & Refining Co., 25 Broadway, New York, N. Y.  
 Kawecki Chemical Co., Boyertown, Pa.

#### SILICA

(Possible Buyers Exclusive of Glass Manufacturers)

Commercial Minerals Co., 319 Irwin St., San Francisco  
 Great Lakes Foundry Sand Co., 720 United Artist Bldg., Detroit 26, Mich.  
 Industrial Minerals and Chemical Co., 836 Gilman, Berkeley, Calif.  
 Industrial Silica Corp., Stambaugh Bldg., Youngstown, Ohio  
 Kaiser Aluminum & Chemical Corp., 1924 Broadway, Oakland, Calif.  
 Linde Air Products Co., 30 East 42nd St., New York, N. Y.  
 Minerals and Insulation Corp., 45 Central Ave., Rochelle Park, New Jersey  
 Silicone Insulation Co., Inc., Butler Place Bronx 61, N. Y.  
 Tennessee Products & Chemical Corp., 512 First American National Bank Bldg., Nashville, Tenn.

#### SPODUMENE

Corning Glass Works, Corning, N. Y.  
 J. E. De Souza Co., Inc., 217 Broadway, New York 7, Pa.  
 Foote Mineral Co., 18 E. Chelten Ave., Philadelphia 44, Pa.  
 Lithium Corp. of America, Inc., Rand Tower, Minneapolis 2, Minn.  
 Maywood Chemical Works, Maywood, N. J.  
 National Enameling and Stamping Co., 270 N. 12th St., Milwaukee, Wis.  
 Owens Corning Fiberglas Corp., Newark, Ohio.  
 C. Tennant, Sons & Co., 100 Park Ave., New York 17, N. Y.

#### STRONTIUM ORES

Associated Metals & Minerals Corp., 40 Rector St., New York, N. Y.  
 J. T. Baker Chemical Co., Phillipsburg, N. J.  
 Barium Products, Ltd., Modesto, Calif.  
 Barium Reduction Corp., Charleston, W. Va.  
 E. I. du Pont de Nemours & Co., Inc., 11th & Orange Sts., Wilmington, Del.  
 Foote Mineral Co., Inc., 12 E. Chelten Ave., Philadelphia, Pa. (minerals).  
 General Electric Co., 1 River Road, Schenectady, N. Y.  
 C. Hardy, 415 Lexington Ave., New York, N. Y.  
 Harshaw Chemical Co., 1933 E. 97th St., Cleveland, Ohio.

#### TALC

(Producers and Grinders of Crude Talc, Pyrophyllite and Soapstone)

Alberene Stone Corp. of Va., Schuyler, Va.  
 American Minerals Co., 840 S. Mission Rd., Los Angeles, Calif.  
 Arkansas Talc Co., Inc., Benton, Ark.  
 Blue Ridge Talc Co., Inc., Henry, Va.  
 Carolina Pyrophyllite Co., Staley, N. C.  
 Commerce Minerals Co., 319 Irwin St., San Francisco, Calif.  
 Eastern Magnesia Talc Co., Inc., 206 Bay St., Burlington, Vt.  
 Gouverneur Talc Co., Inc., Gouverneur, N. Y.  
 Huntley Industrial Minerals, Inc., Box 305 Bishop, Calif.  
 Industrial Minerals & Chemical Co., 6th & Gilman St., Berkeley, Calif.  
 Southern Talc Co., Chatsworth, Ga.  
 Southwestern Talc Corp., Llano, Texas.  
 Stauffer Chemical Co., P. O. Box 68, N. Portland, Ore.

#### TANTALITE (SEE COLUMBITE)

#### TIN

American Smelting and Refining Co., 120 Broadway, New York 5, N. Y.  
 Metal & Thermit Corp., 100 E. 42nd St., New York 17, N. Y.  
 C. Tennant, Sons & Co., 100 Park Ave., New York 17, N. Y.  
 Vulcan Detinning Co., Sewaren, N. J.  
 Wah Chang Corp., Woolworth Bldg., New York 7, N. Y.

#### TITANIUM MINERALS

(Titanium Metal Manufacturers—Ilmenite and Rutile)

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Tucson, Arizona

Dow Chemical Co., Midland, Mich.  
 E. I. du Pont de Nemours and Co., Inc., DuPont Bldg., Wilmington 98, Del.  
 Electro Metallurgical Co., Div. of Union Carbide and Carbon Corp., Ashtabula, Ohio and 30 East 42nd St., New York 7, N. Y.  
 Titanium Metals Corp. of America, 233 Broadway, New York, N. Y.

**(Pigment Manufacturers—Ilmenite)**

American Cyanamid Co., Pigments Div., 30 Rockefeller Plaza, New York 20, N. Y.  
 E. I. du Pont de Nemours and Co., Inc., DuPont Bldg., Wilmington 98, Del.  
 The Glidden Co., Chemicals-Pigments-Metals Div., 900 Union Commerce Bldg., Cleveland 14, Ohio  
 National Lead Co., 111 Broadway, New York 6, N. Y.  
 New Jersey Zinc Co., Gloucester City, N. J.

**(Welding Rod Manufacturers—Ilmenite and Rutile)**

American Brake Shoe Co., 230 Park Ave., New York 17, N. Y.  
 Harnischfeger Corp., 4400 W. National St., Milwaukee, Wis.  
 Stoody Co., Slauson Ave. at Sorenson, Whittier, Calif.  
 Westinghouse Electric Corp., Box 2278, Pittsburgh 30, Pa.

**(Alloy Manufacturers—Ilmenite and Rutile)**

Aluminum Co. of America, 1501 Alcoa Bldg., Washington 6, D. C.  
 Titanium Alloy Manufacturing Co., Div. of National Lead Co., Box C, Bridge Station, Niagara Falls, N. Y.  
 Union Carbide and Carbon Corp., 30 E. 42nd St., New York 17, N. Y.  
 Vanadium Corp. of America, 420 Lexington Ave., New York 17, N. Y.

**(Dealers—Ilmenite)**

L. H. Butcher Co., 3628 Olympia Blvd., Los Angeles 23, Calif.  
 J. E. De Sousa Co., Inc., 217 Broadway, New York 7, N. Y.  
 Foote Mineral Co., 18 W. Chelten Ave., Philadelphia 44, Pa.  
 E. A. Godoy & Co., Inc., 25 Broadway, New York 4, N. Y.  
 Metallurg, Inc., 99 Park Ave., New York 16, N. Y.  
 C. Tennant, Sons & Co., 100 Park Ave., New York, N. Y.

**(Dealers—Rutile)**

Berkshire Chemicals, Inc., 420 Lexington Ave., New York 17, N. Y.  
 Derby & Co., 10 Cedar St., New York 5, N. Y.  
 J. E. De Sousa Co., Inc., 217 Broadway, New York 7, N. Y.  
 Foote Mineral Co., 18 W. Chelten Ave., Philadelphia 44, Pa.  
 E. A. Godoy & Co., Inc., 25 Broadway, New York 4, N. Y.  
 International Titanium Corp., 100 Park Ave., New York 17, N. Y.  
 Metallurg, Inc., 99 Park Ave., New York 16, N. Y.  
 Metal Traders Inc., 67 Wall St., New York 5, N. Y.  
 Orefraction Inc., 7425 Thomas St., Pittsburgh 8, Pa.  
 Phillip Bros., Inc., 70 Pine St., New York 5, N. Y.  
 C. Tennant, Sons & Co., 100 Park Ave., New York 17, N. Y.  
 Wah Chang Corporation, Woolworth Building, New York 7, N. Y.

**TUNGSTEN CONCENTRATES**

Associated Metals & Minerals Corp., 75 West St., New York 6, N. Y.  
 Braeburn Alloy Steel Co., Div. of Continental Copper & Steel, Inc., Braeburn, Pa.  
 Columbia Tool Steel Co., Chicago Heights, Ill.  
 Continental Ore Corp., 500 Fifth Ave., New York 36, N. Y.  
 J. E. De Sousa Co., Inc., 217 Broadway, New York 7, N. Y.  
 Derby & Co., 10 Cedar St., New York 5, N. Y.  
 Fansteel Metallurgical Corp., 2200 Sheridan Road, North Chicago, Ill.  
 Firth Sterling Steel & Carbide Corp., McKeesport, Pa.  
 General Electric Co., Cleveland Wire Works, Lamp Dept., 1331 Char-  
 don Road, Euclid 17, Ohio.  
 E. A. Godoy & Co., Inc., 25 Broadway, New York 4, N. Y.  
 International Bartering Co., 52 Broadway, New York 4, N. Y.  
 Jessop Steel Co., Washington, Pa.  
 Kennametal, Inc., Latrobe, Pa.  
 Latrobe Steel Co., Latrobe, Pa.  
 Metallurg, Inc., 99 Park Ave., New York, N. Y.  
 Molybdenum Corp. of America, 500 5th Ave., New York, N. Y.  
 North Metal and Chemical Co., York, Pa.  
 Reading Chemical Co., Box 53, Wyomissing, Pa.  
 Reduction and Refining Co., Kenilworth, N. J.  
 Salt Lake Tungsten Co., 2160 Indiana Ave., Salt Lake City, Utah.  
 Simonds Saw and Steel Co., Lockport, N. Y.  
 Sylvania Electric Products Co., Tungsten & Chemical Division, Box 70,  
 Towanda, Pa.  
 Union Carbide Nuclear Co., 30 E. 42nd St., New York, N. Y.; Bishop,  
 Calif.  
 Universal Cyclops Steel Corp., Bridgeville, Pa.  
 Vanadium Alloy Steel Co., Latrobe, Pa.  
 Vulcan Crucible Steel Co., Aliquippa, Pa.  
 Wah Chang Corporation, Woolworth Building, New York 7, N. Y.  
 Westinghouse Electric Corp., 1-17 MacArthur Ave., Bloomfield, N. J.

**URANIUM ORES**

**Mills in Operation**

Anaconda Company, Bluewater, (Grants) New Mexico  
 Climax Uranium Co., Grand Junction, Colo.  
 Dawn Mining Co., Ford, Stevens County, Washington  
 Gunnison Mining Co., Gunnison, Colo.  
 Homestake-New Mexico Partners, Grants, N. Mex.  
 Kerr McGee Oil Industries, Inc., Shiprock, N. Mex.  
 Lucky Mc, Riverton, Wyoming  
 Mines Development, Inc., Edgemont, S. Dak.  
 National Lead Co., Monticello, Utah  
 Rare Metals Corp. of America, Tuba City, Ariz.  
 Texas Zinc Minerals Co., Mexican Hat, Utah  
 Union Carbide Nuclear Co., Rifle, Slick Rock, Uravan and Mavbell,  
 Colo.; Greenriver and Thompson, Utah  
 Uranium Reduction Co., Moab, Utah  
 Vanadium Corp. of America, Durango, Colo.  
 Vitro Uranium Co., Salt Lake City, Utah  
 Western Nuclear Corp., Split Rock, Wyoming

**New Mills, planned or under construction**

Apex Mining Co., Austin, Nevada  
 Fremont Minerals Co., Riverton, Wyoming  
 Homestake-Sapin Partners, Grants, N. Mex.  
 Kermac Nuclear Fuels Corp., Grants, N. Mex.  
 Lakeview Mining Co., Lakeview, Oregon  
 Phillips Petroleum, Grants, N. Mex.

**ZINC**

The American Metal Co., Ltd., 61 Broadway, New York 6, N. Y.  
 American Smelting & Refining Co., 120 Broadway, New York 5, N. Y.  
 American Zinc Co. of Illinois, 1600 Paul Brown Bldg., St. Louis, Mo.  
 The Antronics Co., 25 Broadway, New York 4, N. Y.  
 Associated Metals & Minerals Corp., 75 West St., New York 6, N. Y.  
 The Athletic Mining and Smelting Co., Ft. Smith, Ark.  
 The Bunker Hill Co., Kellogg, Idaho.  
 Combined Metals Reduction Co., Felt Bldg., Salt Lake City, Utah.  
 E. I. du Pont de Nemours & Co., 1007 Market St., Wilmington 98, Del.  
 Eagle-Picher Co., Mining & Smelting Div., Miami, Okla.  
 E. A. Godoy & Co., Inc., 25 Broadway, New York 4, N. Y.  
 W. R. Grace & Company, Hanover Square, New York, N. Y.  
 International Bartering Co., 52 Broadway, New York 4, N. Y.  
 International Minerals & Metals Corp., 11 Broadway, New York 4, N. Y.  
 Matthiessen & Hegeler Zinc Co., La Salle, Ill.  
 Metal Traders, Inc., 67 Wall St., New York N. Y.  
 New Jersey Zinc Co., 160 Front St., New York 7, N. Y.  
 Philipp Brothers, Inc., 70 Pine Street, New York 5, N. Y.  
 St. Joseph Lead Co., 250 Park Ave., New York 17, N. Y.  
 The Sherwin-Williams Co., Ozark Smelting & Mining Division, 101 Prospect Ave., N.W., Cleveland 1, Ohio.  
 C. Tennant, Sons & Co., 100 Park Ave., New York 17, N. Y.  
 U.S. Steel Corp., 525 William Penn Place, Pittsburgh 30, Pa.  
 Woodward & Dickerson, Inc., 1400 Penn Square, Philadelphia, Pa.

**ZIRCON**

Associated Metals & Minerals Corp., 75 West St., New York 6, N. Y.  
 F. W. Berk & Co., Woodbridge, N. J.  
 Berkshire Chemicals, Inc., 420 Lexington Ave., New York 17, N. Y.  
 Cohart Refractories Co., Louisville, Kentucky.  
 Derby & Co., 10 Cedar St., New York 5, N. Y.  
 J. E. De Sousa Co., Inc., 217 Broadway, New York 7, N. Y.  
 Electro Metallurgical Div., Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.  
 Foote Mineral Co., 18 W. Chelten Ave., Philadelphia 44, Pa.  
 E. A. Godoy & Co., Inc., 25 Broadway, New York 4, N. Y.  
 International Titanium Corp., 120 Broadway, New York 5, N. Y.  
 Metal & Thermit Corp., 100 E. 42nd St., New York 17, N. Y.  
 Metal Traders Inc., 67 Wall St., New York 5, N. Y.  
 Metallurg, Inc., 100 Park Avenue, New York 17, N. Y.  
 National Distillers Corp., Ashtabula, Ohio.  
 National Research Corp., Pensacola, Fla.  
 Orefraction, Inc., 7505 Meade St., Pittsburgh, Pa.  
 Titanium Alloy Mfg., Div. National Lead Co., 111 Broadway, New York 6, N. Y.  
 C. Tennant, Sons & Co., 100 Park Ave., New York 17, N. Y.  
 Woodward & Dickerson, Inc., 1400 Penn Square, Philadelphia, Pa.

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ORE PURCHASING DEPT. • THE BUNKER HILL COMPANY  
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Smelting and Refining Co.**



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Copper Smelter—Miami, Arizona  
Address: Ore Purchasing Department  
International Smelting and Refining Co.  
P. O. Box 1265  
Miami, Arizona

Lead & Zinc Ores  
and Concentrates

Lead and Lead-Zinc Smelter      } Tooele, Utah  
Lead-Zinc Concentrator            }

Address: Ore Purchasing Department

**International Smelting and Refining Co.**

818 Kearns Building  
Salt Lake City, Utah

Please establish contact prior to shipment

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AND  
SMELTING COMPANY**

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Grade Lead Concentrates.

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Department*

Paul Brown Building  
ST. LOUIS, MISSOURI

423 Mills Bldg.  
EL PASO, TEXAS

927 Old National  
Bank Building  
SPOKANE, WASHINGTON

P.O. BOX 577  
DUMAS, TEXAS

# MINING WORLD DIRECTORY

## of Major

# United States Mining Operations

### ABBREVIATION CODE

Accountant .....	acct
Assistant .....	ast
Brothers .....	bros
Chairman .....	chmn
Chemical .....	chem
Chief .....	ch
Company .....	co
Concentrator .....	concen
Consolidated .....	consol
Corporation .....	corp
Creek .....	cr
Development .....	devel
Director .....	dir
District .....	dist
Division .....	div
East .....	E
Electrical .....	elec
Engineer .....	eng
Flotation .....	flot
Foreman .....	frm
General manager .....	gen mgr
Geologist .....	geol
Gravity .....	grav
Heavy media .....	heav-med
Hydraulic .....	hydraul
Incorporated .....	inc
Limited .....	ltd
Manager .....	mgr
Mechanical .....	mech
Metallurgist .....	met
Mile(s) .....	mi
Milling .....	mlg
Mining .....	mng
North .....	N
Operations .....	oper
Operator .....	op
Owner .....	own
Partner .....	part
President .....	pres
Production .....	prod
Purchasing agent .....	purch agt
Secretary .....	sec
South .....	S
Superintendent .....	supt
Surveyor .....	surv
Treasurer .....	treas
Underground .....	undergr
Vice president .....	VP
West .....	W
Yearly .....	yrly

A CAREFUL SURVEY OF SOME 4,250 MINING and allied processing operations, both active and dormant, was the basis of this list of United States and Alaska mining operations. While MINING WORLD cannot guarantee 100 percent accuracy for this directory, it believes that the list is the best such reference available to the mining industry from any source.

FOR THE GREATEST POSSIBLE UTILITY operations are listed alphabetically by state. Listings are carried under the name of the operating company, owner, mine, or individual operator, according to the wishes of the parties concerned. In cases where properties are commonly known by more than one name, cross references were used where possible. Major companies have more than one listing. Properties and key personnel are listed by states in which the mines are located. There is a cross reference to company executive headquarters and to all other states in which the company operates.

QUESTIONNAIRE FORMS covering major operating details and personnel were mailed over a period of six months. Where information supplied by the operator or owner was not complete, supplementary data was obtained from field reports compiled by staff members, records furnished by the MINING WORLD news bureau, and information from federal and state mining agencies, the United States Atomic Energy Commission, many state geologic departments, state conservation commissions, and state and regional mining associations. Special thanks are extended to the U. S. Bureau of Mines and its regional engineers for help in checking operating properties.

THE PROPERTIES WERE ALL ACTIVE and producing when surveyed, except where "under development" and "idle" have been added. It should be noted especially that many large and important mines are listed in the "idle" class in this directory. This is a temporary situation due to low metal prices. Most of these properties are being kept in good physical repair, water is being pumped from the mines, and they can be placed back in operation within a very short time when management gives the go ahead sign. Totally inactive properties with no indication of future resumption of operations were deleted. Tonnages listed are for daily production, unless otherwise noted. Minerals and metals are listed in order of importance. Key personnel are listed under the address where they may be reached, and unless otherwise specified mill and smelter addresses are the same as those given for the mines.

A SPECIAL NOTE ABOUT URANIUM COMPANIES. Only those uranium companies that are actually operating and/or reportedly made uranium ore shipments in 1957 are listed in this directory. Although MINING WORLD contacted several hundred more uranium companies and hope-to-be uranium companies that are listed on the following pages, only those which gave proof of actually being in the process of production, development, or exploration work were included. Mining companies, mine operators, etc., are listed in the state in which ore was actually mined. Headquarters of the company (producing unit) are then listed and address given even though in another state; which is often the case.

IF YOUR MINE WAS NOT LISTED in this year's directory, fill out the form below, tear it out of the book along the dashed line and mail it to MINING WORLD, 500 Howard Street, San Francisco 5, California, and your name will be added to the list receiving questionnaires for next year's directory section.

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### ATTENTION: New Mine Operators Unlisted Mine Operators

#### LIST YOUR MINE IN THE 1958 MINING YEARBOOK MINE DIRECTORY SECTION

To receive questionnaire for listing your mine complete and mail this form to:

Your Name .....

Your Address .....

Your City ..... State .....

Editor, MINING WORLD

500 Howard Street  
San Francisco 5, California

Mining Company .....

## Alaska

### ALASKA

**ACOFF, HARRY**  
c/o Prince Cr Mng Co, Flat  
PLACER Prince Cr, Iditarod dist,  
nonfloat, Au

**ALASKA METALS MNG CO**  
Box 965, Fairbanks  
STEPOVICH & GOLBERT  
PROPERTIES  
LODE MINES, Gilmore Dome, Fair-  
banks dist, WO<sub>3</sub>  
Under devel

**ALASKA NICKEL CO**  
c/o Fred Jenkins, Eagle  
LODE MINE, Flume Cr, Eagle dist,  
Au  
Under devel

**ALASKA PACIFIC CONS MNG CO**  
510 Colman Bldg, Seattle 4, Wash  
Pres: V A Montgomery  
VP & Gen Mgr: Wm M Stoll  
Sec: Carl W Eiseman  
INDEPENDENCE MINE, 25 mi N of  
Wasilla, undergr  
Idia  
100-TON FLOT - AMAL MILL.  
Idia

**ALDER CREEK MNG CO**  
Box 1099, Fairbanks  
Part: Martin Sather, Jr.  
PLACER 34 mi N of Fairbanks, Au  
**ALLUVIAL GOLDS, INC**  
Coal Creek  
Pres & Gen Mgr: Ernest N Patty  
Dir: Walter Seligman, E D Bell,  
Mrs. A D McRae  
PLACER on Woodchopper Cr, Circle  
dist, Yukon riv region, 4 ft dredge,  
Au  
To operate in 1958

**ATLAS MINES**  
Box 105, Nome  
Pres, Owner & Gen Mgr:  
Geo Waldheim  
PLACER & OPEN PIT MINE, 100  
mi N of Nome, Kougarok dist,  
Seward Penin reg, dragline-doser  
hydraulic, Au  
Prod: 500 yds daily  
MILL, Kougarok

**BARTHLOMAE, WM A**  
P O Box 248, Brea, Calif  
Pres & Gen Mgr: W A Bartholomae  
GOLD PLACER MINE, Gold Run Cr  
Port Clarence  
GOLD MINE, Ester Dome, via  
Fairbanks  
Eng: B W Vallat  
Idle

**BITTNER, PAUL**  
Central  
PLACER Deadwood Cr, Circle dist,  
hydraulic, Au, Ag

**BLISS & SONS**  
Unglik  
PLACER, Bonanza Cr, hydraulic-  
doser, Au

**BRINKER - JOHNSON CO**  
141 Battery St  
San Francisco, Calif  
Pres: W W Johnson  
VP: T Keith Johnson  
PLACER on Caribou Cr, via  
Fairbanks 4 1/2-ft dredge, Au, Ag  
Idle  
(Owned by Walter W Johnson Co  
Dollar Bldg, San Francisco, Calif)

**CANYON CREEK MNG CO**  
Akish  
Gen Mgr: Jens A Kvamme  
PLACER on Canyon Cr, Anak dist,  
Kuskokwim R reg, dozer-doser  
plate-hydraulic, Au

**CARLSON, IVAR C**  
Ophir  
MINE, Little Cr, Inook dist,  
nonfloat

**CARSTENS, HEINE, C &  
DELTA**  
Alaska Co, Central  
PLACER, Portage Cr, Circle dist, Au

**CHANDALAR MNG CO**  
813 3rd Ave, Anchorage  
Op: Hugh Matheson, Jr  
PLACER, Big Cr, Chandalar dist,  
nonfloat, Au

**CHATHAM CREEK MNG CO**  
Box 64, Fairbanks  
Berg, Twelton & Wickstrom  
PLACER, Chatham Cr, Fairbanks  
dist, Yukon R reg, dragline-doser,  
Au

**COLLINSVILLE MINES,  
A PARTNERSHIP**  
1557 H St, Anchorage  
GOLD PLACER, 2, 500-yd dragline  
& nonfloat wash pl, 100 air mi NW  
of Anchorage  
Frm: Carl Durand  
Idle

**COLORADO CREEK MNG CO**  
McGrath  
Part: John E & Richard S  
Fullerton  
PLACER, 60 mi N of McGrath on  
Colorado Cr, Au, Ag  
Prod: 3, 000 cu yds

**CROWN POINT MINES**  
Box 1417, Seward  
Gen Mgr: Anson E Gouldberry  
CROWN POINT MINES, undergr, Au  
MILL, 25 mi, Seward  
Idle

**DAHL CREEK MINE**  
709 - 3rd Ave, Fairbanks  
Op: C E Stout  
PLACER, Dahl Cr, Shungnak dist, Au

**DE COURSEY MT MINING CO**  
Red Devil  
Pres: Ray Wolfe  
VP: Robert Lyman  
Sec-Treas: H R Heard  
RED DEVIL MINE, Red Devil, undergr  
Hg  
Gen Mgr: R S Velikanje  
Asst Gen Mgr: Warren Rice  
Geol: Leo F Fay  
DE COURSEY MINE, 20 mi N of  
Crooked Cr, Kuskokwim River, Hg  
Idle  
RED TOP MINE, Marsh Mt, Alekn-  
gik, Hg  
Mine Supt: Frank James  
Under devel

**DONLIN PLACERS**  
Crooked Creek  
Own: Robert F Lyman  
PLACER in Snow Gulch 10 mi N of  
Crooked Cr, Anak dist, Kuskokwim  
Riv pg, dozer, Au  
Idle

**EDGECUMBE EXPLORATION CO**

218 S Hudson, Pasadena 5, Calif or  
Box 758, Sitka

Pres: C T Morgan  
VP: C A Haley

Treas-Gen Mgr: G H Morgan

Sec: A Holden

ECO MINE, Silver Bay, Undergr,

Au, Ag  
Idle

ECO GRAV MILL at Silver Bay

(See Calif)

**FERN GOLD MNG CO**

502 Columbia Bldg, Spokane, Wash

Pres: J L Drumheller

VP: Martin Woldson

Sec: L R Gordon

FERN MINE, Palmer, undergr, Au

Idle

**FRANKLIN MNG CO**

Tok Junction

Part: Howard Bayless, Dick Roberts,

Bob Roberts & Ellis Roberts

PLACERS at Franklin & Chicken,

hydraulic, dragline, dozer, Au

**FRASCA & CO**

Box 1182, Fairbanks

PLACER on Eagle Cr, Circle dist,

hydraulic-doser

(Leased from Berry Holding Co)

**FREMONT MNG CO**

400 Torrey Bldg, Duluth 2, Minn

Man Part: Warren S Moore

Ch Geol: John P McKee

Exploration

(See Minn)

**GOLD PLACERS, INC**

Coal Creek

Pres & Gen Mgr: E H Patty

VP: Walter Seligman

Dirs: E B Bull & Mrs A D McRae

PLACER, Circle dist, Au, 4 ft dredge

**GOLD STREAM MNG CO**

Box 2116, Fairbanks

Pres: D G Bredt

VP: Emil Usibelli

Sec: Charles Clasby

PLACER, Goldstream Cr, near Fox,

Nonfloat, Au

Mine Firm: Henry Falke

**GRANITE CREEK MNG CO**

Ruby

Pres: Wm Carlo

VP: Wm Carlo, Jr

Sec: P Carlo

PLACER on Ophir Cr, 50 mi S of

Ruby, Yukon reg, hydraulic-doser,

Au

**GRANT CREEK MNG CO**

Tanana, P O S3

Part: Lars Ingard, Frank C Edging-

-ton

PLACER, Grant Cr, approx 25 mi

W of Tanana, Au

Prod: 1,000 to 1,200 cu yds

**GOODNEWS BAY MNG CO INC**

422 White Bldg, Seattle 1, Wash

Pres: Andrew O Olson

VP & Gen Mgr: Edward Olson

Sec: G D Connor

Treas: C J Johnston

GOODNEWS BAY PLACER, Platinum

Gen Mgr: Edward Olson

Asst Gen Mgr: John W Weeks

**HARD, ERIC**

Ophir

BEAR CR PLACER, Poiger, Au

Mine Supt: Eric Hard

**HASSEL MNG CO**

Box 1071, Fair

PLACER, Ready Bullion Cr, Fair-

banks dist, Au

**HAVENSTRITE OIL CO**

MNG DIV

Candle

PLACER Candle Cr, Fairhaven

dist, nonfloat, Au

**HEINER, LARRY**

LODE PROSPECTS, PLACER,

Petersburg & Kupreanof dists, Au

Idle

**HERBERT SYNDICATE**

Box 1108, Fairbanks

Mgr: Charles F Herbert

Exploration

**HOLMES, WALTER L**

May Creek via Cordova

REX CREEK MINE, Nicina dist, Au

placer, open pit, hydraulic, Au

Under devel

**HUNTER CREEK MNG CO**

c/o Melo Jackovich, Rampart

PLACER on Hunter Cr, Rampart

dist, hydraulic-doser, Au

Prod: 600 yds

**HYDER MINES, INC**

904 4th Ave, Seattle 4, Wash

Pres: Donald H McNelly

VP: Edward R Wheat

Sec-Treas-Purch Agt: J W Bothe

RIVERSIDE & CANTU MT MINES,

Hyder, undergr, pb, ag, WO<sub>3</sub>, Au,

Cu, Zn

Mine Supt: Henry L Hill & Assoc

Under devel

100-TON FLOT MILL, at Riverside

mine

Idle

**I & M MNG CO**

Box 2055, Ketchikan

Pres: Lee Hollenbeck

VP: Irma Hollenbeck

Sec: Charles W Miller

I & M MINE, Kendrick Bay,

Ketchikan dist, Usg

Under devel

**IMMACHUK MNG CO**

Box 272, Nome

Own: Grant H Nelson

PLACER, Dearing, Au,

Idle

**KENAI CHROME CO**

545 E 4th St, Anchorage

Part: John G Bachner

Part & Gen Mgr: Mike E Seller

STAR NO 4 MINE, Red Mt, Homer

Cr, undergr, Cr<sub>2</sub>O<sub>3</sub>

Asst Gen Mgr: Karl A Bachner

Mine Firm: Norman Crooks

Prod: 100 long tons

80-TON ROD MILL, at mine

Mill Supt: Mike E Seller

Under devel

**KENDRICK BAY MNG CO**

Mines Park, Golden, Colo

Pres: Frank Coolbaugh

VP: John J Curson

Sec: John P Fitz-Gibbon

Treas: Thomas E Congdon

KENDRICK BAY MINE, Prince of

Wales Island, Alaska, open pit, U3O<sub>8</sub>

Devel Mgr: W Ernest Jones

Field Supt: Harold Wright

Mine Eng: Garry Bennett

(See Colo)

**KODIAK EXPLORATION CO,  
INC**

Box 448, Kodiak

Pres: George H Cornelius

VP: Emil Knudsen

Treas: Robert von Scheele

Purch Agt: Ralph Johnson

Field Dir: Henry Neseth

KECO PIN ROCK MINE, Kodiak,

undergr, WO<sub>3</sub>, Cu, Au

Gen Mgr: Henry Neseth

Asst Gen Mgr: Tom von Scheele

Geol: Charles H Scott

Mech Eng: Walter Achen

CLAIMS, undergr, open pit, placer,

U3O<sub>8</sub>, WO<sub>3</sub>, Au, Cu, Ni, Co, Ag

**KOUGAROK FREIGHT & MNG CO**

Box 137, Nome

Part: E C Straub & E Towner

PLACER, 11 mi NE of Nome, Au,

dredge

Prod: 30,000 yds yearly

**LAST CHANCE MNG CO**

Box 639, Nome

Op: William S Mung

PLACER, Bluff, Au, bucket-line

floating dredge

**LAZO URANIUM ASSOC**

Box 893, Ketchikan

MINE, S Arm Moira Sound,

Ketchikan dist, U3O<sub>8</sub>, Th

**LEE BROS DREDG CO**

Solomon

Gen Mgr: Richard Lee

PLACER on Solomon Riv, Seward

Penin, bucket Au, Lee,

Eng: Allan W Lee

Prod: 7,500 yds

**LITTLE MINOOK MNG CO**

Fairbanks

Pres & Gen Mgr: Albin Martin

PLACER on Little Minook Cr,

Rampart dist, dragline-hydraulic-

doser, Au, Ag

Prod: 600 yds

**LONG CREEK MNG CO**

Ruby

Gen Mgr: Hans Tilliesen

PLACER at Long Cr, Hydraulic-

doser-dragline, Au, Ag

**LOST CHICKEN HILL MINES INC**

2438 N Shore St, Chicago 45, Ill

c/o George Turner

PLACER, Lost Chicken Cr,

Fortymile Dist, Au

**LUCKY EIGHT MNG CO**

Eagle

Oper: Burnett F Hansen, Borghild

Hansen

PLACER, Crooked Cr, Au

**LUCKY NELL MINE**

Hollis

Own: J J Matsuka

MINE, 7 mi N of Hollis, undergr,

Au, Ag, Pb, Cu

Under devel

**PUYALLUP MINE, 1 1/3 mi W of**

Hollis, undergr, Au, Ag

Under devel

**CASCADE MINE, 3 mi SW of Hollis,**

undergr, Au, Ag

Under devel

**LUCKY SEVEN MINE**

Milner House

Op: Walter Roman

PLACER, Mastodon Cr, Circle dist,

dozer-hydraulic, Au

Stripping

Under devel

**MINING WORLD**

**Alabama**

**MACLAUREN RIVER COPPER**  
Box 400, College  
**KATHLEEN-MARGARET COPPER**  
MINE, College, undergr., Cu, Au, Ag  
Under devel

**MANSKE, DAN**  
Chicken  
PLACER, Ingle Cr., Fortymile  
dist., Au

**MC COMB, ROBERT**  
Chicken  
MINE, S Fort Fortymile Riv.,  
Fortymile dist

**MINERALS RESEARCH**  
2 Marine Way, Juneau  
Exploration only

**MISCOVICH BROTHERS**  
Poorman, Flat

Part: George Misovich,  
John A Misovich,  
Howard Misovich,  
Andrew Misovich  
PLACER, Poorman, Au  
PLACER, Flat, Au  
Prod: 300,000 to 500,000 cu yds yrly

**NATIVE BISMUTH, INC**  
Box 267, Nome  
Pres & Gen Mgr: O A Margraf  
VP: D W Russell  
CHARLEY CREEK BISMUTH MINE,  
35 mi N of Nome, undergr., Bl,  
B1g3, Au  
Idle

**NEW YORK - ALASKA GOLD**  
DREDGING CORP  
1616 Smith Tower, Seattle, Wash  
Pres & Man Dir: J K Crowley  
VP: G C King  
VP, Mark Mathewson  
Sec: Leise G Robbins  
Treas: Fannie Barley  
Purch Agt: L E Robbins  
NEW YORK - ALASKA MINE, 60  
mi NE of Bethel, placer, 3 dredges,  
dragline, Au  
Res Mgr: Wm H Race  
Ass't Mgr: M P Bailey  
Elec Eng: Clarence Clark

**NEWMONT MINING CORP OF CANADA LTD**  
604-744 West Hastings St, Vancouver, B.C., Canada  
Pres: John Drybrough  
VP: P Maloszoff  
Sec: A W Bur  
Treas: J L MacKidd  
Exploration

**NORTH AMERICAN DREDGE CO**  
Flat  
Dir: Alex Mathiesen  
PLACER, Flat, Iditarod dist.,  
2,500 yd bucketline, dredge, Au

**NORTHERN LIGHTS MNG CO**  
Ruby  
Gen Mgr & Mech Eng: Michael Carroll  
PLACER, Ruby dist., Au

**NOVATNEY, ROBT A**  
104 West 9th St, Juneau  
Sec-Treas: Dorothy H Novatney  
MILLER LEDGE & LODE, Heim Bay,  
open pit, Au, Ag  
Under devel

**OLIVE CREEK MINES**  
Box 552, Fairbanks  
Own-op: Carl Parker  
PLACER on Olive Cr., 80 mi NW  
of Fairbanks, dragline-doser, Au, Ag  
Prod: 900 cu yds

**P R & H MINING CO**  
Miller House  
Part: P D Parker, J W Raymond,  
F O Hopkins  
MASTADON CR PLACER, 188 mi  
N of Fairbanks, Au, Ag  
Prod: 1,000 yds

**PEKOVICH, W S**  
Box 2642, Juneau  
MINE, Port Shetland, Juneau dist.,  
Fe  
Under devel

**PILGRIM, EARL R & CO**  
Box 1896, Fairbanks  
Own & Gen Mgr: Earl R Pilgrim  
STAMPEDE MINE, Stampede, 10  
mi SW of Fairbanks, undergr., 35  
40-TON GRAV MILL  
Idle

**PITTS, E H**  
Big Lake  
**PITTS PLACERS**, Big Lake,  
hydraulic, Au, Ag  
**PRINCE CREEK MNG CO**  
Flat  
Own: Harry Agoff  
PLACER on Prince Cr., Iditarod  
dist., Yukon Riv reg., hydraulic, Au  
Idle

**PRINCE MNG CO**  
216 Front St, Ketchikan  
PROSPECT, SE Alaska, U30s  
Idle

**PRITCHETT, HEATH & TUCKER**  
2401 3rd Ave, Ketchikan  
MINE, SE Alaska, U30s  
Under devel

**PROSPECTORS, INC**  
344 2nd Ave, Fairbanks

**PURDY, FRED & ARTHUR**  
Chicken  
PLACER on Myers Fork, 40 mi  
dist., Yukon Riv reg., dozer-  
hydraulic, Au

**PURKEYPILE, I W**  
Box 572, Fairbanks  
PLACER on Tokosinan Cr., 30 mi W  
of Tanana, Sn, Au  
Under devel

**QUEBEC METALL IND, LTD**  
c/o J Bonkowki, Box 40, Haines  
PLACER & LODE, near Klukwan,  
Juneau dist., Fe  
Under devel

**RAINBOW MNG CO**  
None  
Pres: Frank H Whaley  
VP: Frank B Whaley  
PLACER, 90 mi N of Nome, open  
pit, Au

**ROSANDER & REED**  
Ophir  
Pres: T Rosander  
PLACER, Yankee Cr., Innoko dist.,  
hydraulic-doser-dragline, Au

**SAVAGE, PAT**  
Ruby  
PLACER, Long Cr

**SCHAEPFER, RUSSEL R**  
Crooked Creek  
CINNABAR CR PLACER, Kuskokwim  
Riv, undergr., Hg  
Prod: 10 tons daily  
10-TON MILL, at mine  
Idle

**SCHWAESDALL, ANDY**  
Fairbanks  
PLACER on Myrtle Cr., Koyukuk dist.,  
Yukon Riv reg., Au  
Idle

**SELDOMIA CHROME CO INC**  
Selidvia  
Pres: John Little  
VP: Dallas Newell  
Sec: Frank Roby  
MINE, Selidvia, open pit, Cr  
Under devel

**SLATE CREEK MNG CO**  
Box 1564, Fairbanks  
PLACER, Slate Cr., Koyukuk dist.,  
Au, Ag

**SLATE CREEK PLACERS**  
400 7th St, Hamilton Acres,  
Fairbanks  
Own: Hilliard Avnet  
PLACERS, Slate Cr., Rampart, Au  
Idle

**SOUTH FORK MINING CO**  
Chicken  
Own: R S McCambe  
Sec: Muriel McCombe  
PLACER, dozer-pump, Au  
Under devel

**SOUTHEASTERN MNG & EXPLORATION CO, INC**  
c/o Paulineer, Barfield and  
Brochever, Juneau  
Pres & Gen Mgr: Howard C Hayes  
VP: Ray Barfield  
Sec: Jim Smith  
Treas: Gordon Kanouse  
LUCKY SIX MINE, Box 1126, Douglas,  
Undergr., U30g, Rare earths  
Under devel

**SQUAW CREEK MNG CO**  
Fairbanks  
Op: Edwin C Gelvin  
PLACER, Squaw Cr., Circle dist., Au

**STANICH BROS**  
Fairbanks  
PLACER, Porcupine Cr., Koyukuk  
dist., Au

**STRANDBERG MINES, INC**  
828 4th Ave, Anchorage  
PLACER, Colorado Cr., Innoko dist.;  
Indian Riv, Hughes dist.; Eureka Cr.,  
Hot Springs dist., Au  
LODE PROSPECT, Yentna dist., Au  
NIXON PORK MINE, McGrath dist

**THUNDER MINES, INC**  
Anchorage  
PROSPECT, Thunder Cr., Yentna dist.,  
Au  
Idle

**TIGER TALISMAN PLACER**  
Box 294, Nome  
Gen Mgr: J H Alexander  
250-yd hydraulic-doser, Au, Ag

**TIMBERLINE PLACERS**  
c/o Spade & Stout, Miller House  
PLACER, Porcupine Cr., Circle dist.,  
Au  
Idle

**U S SMELTING, REFINING & MNG CO**  
Box 1170, Fairbanks  
VP & Gen Mgr, Alaskan Opr: J D  
Crawford  
FAIRBANKS DEPT., 7 gold dredges in  
Fairbanks area  
Mgr: J C Boswell  
Mine Sup: T A Loftus  
Dredge Sup: W A La Fox  
Cashier: L E Linck

Prod: 6,000,000 cu yds gravel  
HOGATZA OPERATIONS, I gold  
dredge  
Sup: Ralph B. Norris  
Prod: 200,000 yds gravel  
HOME DEPT., 3 gold dredges  
Mgr: C J Glavinovich  
Sup: W A Glavinovich  
Cashier: Robert Baldwin  
Prod: 3,000,000 cu yds gravel  
(See Aris, Mass., N Mex, Utah)

**U S STEEL CORP**  
525 William Penn Pl, Pittsburgh 30,  
Pa

**EXPLOR, SE Alaska**  
(See Ala, Calif., Minn., Pa., Tenn., Utah,  
Wyo)

**UOTILA & HARD**  
Ophir  
Gen Mgr: Gus Uotila  
OPHIR CR PLACER, Au

**WACKWITZ, FRED**  
Box 159, Fairbanks  
PLACER, Bedrock Cr., Fairbanks  
dist., shovel-in, Au  
LODE, head of Cleary Cr., Pb

**WESTERN ALASKA MNG CO**  
Box 121, Spensard  
Op: R J Anderson  
MINE, Russian Mine, Aniak dist., Hg

**WILKINSON, ROBERT W**  
Miller House  
PLACER, Miller Cr., Circle dist., Au

**WOLF CREEK MNG CO**  
Box 141, Fairbanks  
Pres: Andrew Anderson  
VP: Geo Gutmann  
Gen Mgr: M Olson  
PLACER, 26 mi N of Fairbanks,  
stripping over, Au

**ZAIER, CLARENCE**  
Ruby  
PLACER on Greenstone Cr., drift., Au

**ALABAMA**

**ALABAMA FLAKE GRAPHITE CO**

320 Conner Bldg, Birmingham  
Pres & Gen Mgr: W L Shumate, Jr  
VP: W L Moore, S P McDonald  
Sec-Treas: J F Berry Baugh  
POCAHONTAS MINE, 4 1/2 mi W of  
Achland, Ala, open pit, Crucible  
graphite, mica  
Asst Gen Mgr: Joseph Sims

Gen Sup: W L Moore  
Geol: H L Williams  
Met: L B Adams  
Under devel  
500-TON FLOT MILL  
Idle

**AMERICAN TALC CO**  
Chatsworth, Ga  
Pres: M Woodward Glenn  
VP: Francis T Glenn  
Sec: J R Ferry  
MINE, WINTERBORO, open pit, talc  
Mine Sup: N R Davis  
Prod: 100 tons  
50-TON GRAV MILL, Alpine  
Mill Sup: T E Davis  
(See Ga)

**ARRINGTON MNG CO**  
Cedartown, Ga  
WASH PLANT, Glenwood, Brundidge,  
Pike County, Fe

**B & S MNG CO**  
Greenville  
WASH PLANT, Butler County

**BIBB MNG CO**  
Brundidge  
WASH PLANT, near Brundidge

**DIXIE MINES, INC**  
Box 365, Heflin  
Pres & Treas: Ernest Kretschmar  
VP & Purch Agt: Joe W Bailey  
Sec: Robert Abbott  
Adm Asst to Mgr: Eldridge Loudermilk  
SHEFFNER MINE, Micaville, open  
pit, mica  
Gen Mgr: Joe W Bailey  
Geo: E C Van Horn  
Mine Frm: Glenn Gibson  
MILL, wash, screen, tabling  
Mill Frm: Almond Hughes

**GLENWOOD MNG CO, INC**  
Glenwood  
Pres & Gen Mgr: I D Gibson  
VP & Purch Mgr: C B Gibson  
Sec-Treas: D F Jackson, Sr.  
GLENWOOD MINES, open pit, Fe  
Gen Sup: H A Patton  
Mech Eng: M G Cornett  
Prod: 1,000 tons  
MILL  
Mill Sup: W D McLeod  
Asst Mill Sup: H H Patten

**GREENVILLE MNG CO**  
Greenville  
WASH PLANT, Butler County

**REPUBLIC STEEL CORP**  
Birmingham  
EDWARDS MINE, Birmingham,  
undergr., Fe  
Mgr: B H McCrackin  
Sup: B C Jones  
Elec Engr: J Donohue  
Ch Engr: R B Watt  
Maint Engr: E Head  
Prod: 600,000 tons per yr  
SPAULDING MINE, Birmingham,  
undergr., Fe  
Sup: J G Blackwell  
Frmt: P E Roy  
Eng: George Jones  
Prod: 1,000 tons  
GRAV CONC  
Prod: 400,000 tons per year  
GRAV CONC  
Prod: 250,000 tons per year  
BLAST FURNACE, E Thomas, Ala  
BLAST FURN & STEEL PLANT  
Gadsden  
Soc Dist Mgr: C Barrett  
(See Mich., Minn., NY, Ohio)

**SHOOK & FLETCHER SUPPLY CO**  
1814 1st Ave N, Birmingham  
Pres: P G Shook  
VP: A M Shook, III  
Sec-Cont: H O Thomas, Jr.  
Purch Eng: L M Quick  
BLACKBURN & WARNER MINES,  
Russellville, surface, Fe  
Gen Mgr: E H Craddock  
ADKINS MINE, Woodstock, surface,  
Fe  
Gen Mgr: H C Gunter  
Prod: 2,500 tons

**U S PIPE & FOUNDRY CO**  
3300 1st Ave N, Birmingham  
Pres: C S Lawson  
VP: Fred Osborne  
Sec: J W Brennan  
Treas: W S Wilson  
Purch Agt: H E Cross  
Gen Sup: J W Nicol  
Geo: Jack E Morris

## Arizona

Mng Eng: Geo Jones  
Met: R H Stacey  
Elec Eng: L E Staffman  
Safe Eng: J A Downey

RUSSELLVILLE MINE, 7 mi SE  
Russellville, surface, Fe

Sept: S A Britton

Frm: Hobart Norton, H McAllister

Prod: 300 tons

HEAVY MEDIA MILL

Prod: 1,200 tons of limonite per day  
BLAST FURNACES, Birmingham

Gen Sup: Dan Watkins

RUFFNER #2 MINE, Irondale, 7 mi

E of Birmingham, undergr., Fe

Idia

SLOSS #2, Bessemer, 12 mi W of

Birmingham, undergr., Fe

Sept: J W Russell

Asst Sup: P M Snow

U S STEEL CORP  
TENNESSEE COAL & IRON  
DIVISION

P O Box 399, Fairfield

Pres: A V Wielch

Exec VP: W H Kinnear, Jr

VP-Oper: W E Crouch, Jr

Mgr, Raw Mat: E P Reed

Ch Engr, Raw Mat: W S Springer

Purch Agt: L C Teague

IRON ORE MINES & COND PLANT,

6 undergr mines near Bessemer

Cap: 4,650,000 net tons crude iron

per year

Gen Sup: A W Beck, Jr

Sept: 97 and 8 Mines: P J Zukow

Sept: 9, 10, 11 & 14 Mines:

R W McElroy

Sept: Ore Cond Plant: G M Neal

(See Alaska, Calif, Minn, Pa, Tenn,  
Utah, Wyo)

WILSON, D M, BAUXITE CO

Eufaula

WILSON, R E, MNG CO

Eufaula

MINE, bauxite

Prod: 80 tons

20-TON MILL, Eufaula

Sept: Paul Taylor

WOODWARD IRON CO

Woodward

Pres: E E Urquhart

VP: W R Bond

Sec: D T Turnbull

Gen Sup: John Hager

Met: F W Leonard

Safe Eng: Stanley Mooney

Purch Agt: H K Stokes

PYNE MINE, 8 mi S of Bessemer,

undergr, iron ore

Mine Sup: T W Davis

Asst Mine Sup: W H Thompson

Mine Engr: S E Sullivan

BLAST FURNACE, Woodward

Sept: J B Casey

Asst Sup: C Y Huff

Prod: 772,632 net tons per year

ARIZONA

JAMES D AKINS CO

1126 Petroleum Bldg, T14 #4  
Olympic, Los Angeles 15, Calif.  
CONFUSION #1 MINE, Yuma County,  
Mn

AKKEN MINES

2307 N 24th St, Phoenix

Pres: J Akren

Gen Mgr: Fred Jenkins

PIONEER MINE, 20 mi E of

Florence, undergr & surface Au,

Ag, Cu, Th

Under devel

GLENOWAN MINES, Ig, pitchblende

Under devel

ALBA MNG CORP

Sanders

CHETO MINE, Apache Cty, surface,

limonite

Mgr: Spencer Baloudib, Jr

ALKEY MINE

Tombstone

Own: E B Escapido

Pb, Ag

Mgr: Jeff Humphrys

Idia

ALTA URANIUM INC

100 & Grand, Grand Junction,

Colo

Pres: R E Dorwart

V: Tom Castro  
Sec: O O Taylor  
Treas: G R Simpson  
GUANO CARES MINE, San Simon,  
UgOg

Mine Sup: Wm Nelson

ALTUDA MINES, INC

P O Box 1743, Yuma

Pres: James V Spagon

Gen Mgr: Harry E Hamilton

VP & Asst Gen Mgr: Doyle C Gillis

ALTUDA MINE, 23 mi SE of Gila

Bend, undergr, Au, Ag

Idia

ARAPAHO MNG & URANIUM  
CORP

Jefferson

Pres: Dr Ralph M Stock

VP & Gen Mgr: C J Gillaspay

MALACHITE COPPER MINE,

Jefferson County, open pit, Cu, As,

Ag, Si

AMBROSIA MINERALS, INC

163 First Nat'l Bank Bldg,

Phoenix

Pres: John V Persons

VP: Neil A Rice

Sec-Treas: H W Haynes

PURPLE PANZ MINE, Agua, open

pit, Mn

Gen Sup: Ted Wyatt

GRAY & HEAVY MEDIA MILL, Agua

(See H Marx)

AMERICAN COPPER &

URANIUM CORP

Globe

FOUR BAGGER MINE, Gila Cty,

surface & undergr, Cu, Ag, UgOg

Mgr: L O Goodwin

Idia

AMERICAN FIBER CORP  
(SUBSID OF HOLLY  
MINERALS CORP)

Drawer 2880, Globe

Pres: A H McRae

VP: J C Heaton

Sec: H Melanson

Treas: H Melanson

Purch Agt: R E Town

ROCK HOUSE, CLARINE, & CHINLE-  
TILE MINES, Gila County, undergr.,  
asbestos

Gen Mgr: Harry Anderson

Geol: J Thiel Sullivan

Surveyor: Don F Simmons

Mine Sup: Paul Norris

Mine Frm: J Peres, W Jenkins

Prod: 45 tons

MILL, Rock House mine, crushing &

screening

Mill Sup: G B Gulledge

Frm: M Reeves

Prod: 100 tons

MILL, Chrysotile mine

Frm: W Jenkins

Prod: 100 tons

AMERICAN SMELTING &

REFINING CO

WESTERN MNG DEPT SW DIV

813 Valley Nat'l Bldg, Tucson

Mgr: T A Sneddon

Asst Mgr: A C Hall

Ch Geol: Kenyon E Richard

HAYDEN PLANT, Hayden, 1200-ft-deep

smelt & cov, Cu

Sept: P J Downey

SW ORE PURCH OFFICE

810 Valley Nat'l Bldg, Tucson

Mgr: Fred Welch

SILVER BEEL MINE, Silver Bell,

surface, Cu

Gen Sup: D R Purvis

Prod: 7,500 tons

MILL, Silver Bell, rot

(See Calif, Colo, Idaho, Ill, Kan,

Mont, Neb, N M, Nev, N Y, Tex,

Utah, Wash & Federal Mng &

Smelting Co, Mo)

AMERICAN URANIUM CORP

217 Sixth St, S W, Albuquerque,

N Mex

SCHOOL BOY & ASA CODY MINES,

Navajo Indian Reservation, surface,

UgOg, V

Gen Mgr: E T Chase

Gen Sup: Wm J Elam

Geol: Dale H Carlson

Asst Mine Sup: Asa Cody

Mine Eng: E T Chase

AMERICAN ZINC, LEAD &

SMELTING CO

1515 Paul Brown Bldg, St Louis,

Mo

HILLTOP MINE, Portal, undergr,

Pb, Zn, Ag, Cu

Idia

(See Ill, Mo, Okla, Tenn, Tex, Wash)

AMPET CORP

Colorado Bldg, Denver, Colo

Pres: R A Gus Davis

Sec-Treas: Alfred O Brehmer

MINE, Apache County, UgOg

(Leased to K S Mittry)

(See Colo, Utah)

ANCHAS ASBESTOS CO

Box 1593, Globe

REYNOLDS FALL ASBESTOS MINE,

UgOg

Idia

APACHE MINING CO

P O Box 584, St Johns

UgOg Prod

ARI - MICH MINES, INC

Box 701, Prescott

Pres & Gen Mgr: C W Gabrielson, Sr

VP: Harold Gates

Sec: Lywood Webb

Gen Sup: C W Gabrielson, Jr

CATCOTT MINE, 12 mi SW of

Prescott, undergr, Ag, Au, Pb,

Zn, Cu

Under devel

ASH PEAK LEASE

Box 208, Duncan

COMMERCE & SHAMROCK MINES,

Ag

Idia

ATHLETIC MNG CO

Box 2228, Phoenix

VP & Gen Mgr: C W Gabrielson

Sec: Ander H Orr

HEAD CENTER MINE, 12 mi NW of

Klondyke, undergr, Zn, Pb, Cu,

Ag, Au

Mine Sup: James Bryce

Mine Eng: A M Bosworth

Idia

PANAMA MINE, Zn, Pb, Ag

Mine Eng: A M Bosworth

Idia

150-TON FLOT MILL, Klondyke

Mill Sup: Borden Burress

Assay: Ervin Kugendall

Idia

AZTEC MINING & DEVEL CO

7151 S Missiondale Rd, Tucson

Op: Harold Stevens & Phil Stevens

KEystone MINE, Cochise Cty, Cu

Under devel

B & E MNG CO

Box 42, Tumacacori

Pres, Gen Mgr, Mine Eng: D D

Burster

VP: George Eis, Jr

BULL SPRINGS MINE, Josephine

Canyon dist, undergr, Pb, Ag, Au, Cu

Mine Sup: Louis Stickrath

Prod: 50 tons

B S & K MNG CO

Suite 707 1st Fl Kali Bldg,

411 N Central Ave, Phoenix

Pres & Gen Mgr: A M Kalaf

VP: George Kalaf

Sec-Treas: Lee Newson

ATLAS MINE, Box 18, Silverbell,

19 mi SW of Red Rock, undergr, Cu

Zn

Geol: A M Rugg, Jr

Min Frm: Walter Whitlow

125-TON FLOT MILL, 19 mi SW of

Red Rock

Min Frm: Milton Reeves

BAGDAD COPPER CORP

Bagdad

'Pres: J C Lincoln

VP: Frank Snell

Sec: R H Jamison

Treas, Gen Mgr: G W Schultheis

Controller: M Thon

BAGDAD MINE, Bagdad, surface,

Cu, Mo, Ag

Asst Gen Mgr: R C Bogart

Mech Eng: C R Hammans

Met: E S Howell

Elect Eng: W D Deacon

Safety Eng: B J Henderson

Chi Eng & Mine Sup: E LeRoy Jones

Min Frm: D V Pike, Van Irwin

Prod: 5,000 tons

3,500-TON COPPER FLOT MILL,

Bagdad

Sup: Gaylen Guest

Fr: A T Weatherhead, B P Mullins,

D V Tilborg

Assayer: D T Holmes

BALCONES CORP

403 E Travis St, San Antonio, Texas

DOG TOWN MINE, Pima County,

undergr surface, Pb, Ag

Mgr: Geo Edwards

Under devel

(Leased from Fred P. Phelan, 80 N

Church St, Tucson)

BALESTEROS, RICHARD

Ajo

SAN ANTONIO MINE, Pima County,

SiO2

## Arizona

**BAKKER, MRS LUCILLE**  
Peoples Valley  
**CHRISTMAS HOLIDAY MINE**, Au, Ag

**BANNER MNG CO**  
2042 Conner Street, Tucson

Pres: E S Bowman  
VP & Gen Mgr: A B Bowman

Sec-Treas: L L Travis, John M Wallace

Perch Agt: James E Hodge

Perch Agt: E C Bowman

DAISY & MINERAL HILL MINES,

Tucson, undergr., Cu, Ag

Gen Min Supt: B W Venable

Cf Acc't & Ass't Sec: P C Prince

Mine Supt: Wm Anderson, Jr

Mine Frmr: Gus Holzworth

Mine Surv: Alton Young

Geol: F D MacKenzie

Met: Paris Brough

Mast Mech: E E Bray

Plant Eng: G E Jackson

Chem: R G Miranda

Cfm Elect: H Hodgers

TWIN BUTTES MINE, Tucson

Edie

1,000-TON PLOT MILL, Mineral

Hill mine

Supt: Frank Horne

(See H Mine)

**BEAR CREEK MNG CO**

719 E Copper, Tucson

Mgr: Ray Robinson

LONE STAR MINE, 10 mi NE of

Safford, undergr.

Under devel

**BECCHETTI COPPER CORP**

2525 E Osborn Rd, Phoenix

Pres: Anton D Beccheti

VP: Arthur Rando

Sec: William Reddie

Treas: George Hansmann

Purch Agt: Felix Falus

CLIFF & SILVER PLATE MINE,

Box 503, Cottonwood, undergr., Cu,

Au, Ag, Th

Gen Mgr: Felix Falus

Asst Gen Mgr: Bill Schrambling

Geol: Harold Ferrin

Mine Supt: Ignacio Picon

Ass't Mine Supt: Jesus Rodriguez

Mine Frmr: Gilbert Langdon

Mine Eng: Bob Burne

Prod: 50 tons

PLOT MILL, Cottonwood

**BEE - SHO - SHEE MNG CO**

c/o George Newitt, Fruta, Colo

BEE-SHO-SHEE MINE, Apache City,

undergr., surface, U<sub>3</sub>O<sub>8</sub>, V

Mgr: George Newitt

**BEN HUR MNG CO**

Klonkyde Rural Station, Wilcox

BEN HUR MINE, Graham County Ph.

Zn

Idle

**BIG HOLE MNG CO**

c/o Albert Adams, Box 125,

Jerome

UNITED VERDE MINE, Yavapai,

open pit, Cu

**BIG HORN MNG CO**

185 Montgomery St, San Francisco, Calif.

Pres: Daniel Pickrell

BLACK ROCK MINE Maricopa Co.

open pit, Mn

Prod: 200 tons

**BIG SIX CO**

Box 665, Clow

Pres: Jim Brookbank

VP: Bill Stanfield

Sec: M Rosales

Treas: V A Cordell

Purch Agt: W A Kaeppele

Q U MINE, Globe

Idle

**BIG SIX EXPLOITATION, INC**

Young

Mgr: R J Allison

BOOCER ASHFORD MINE, Gila City,

U<sub>3</sub>O<sub>8</sub>

CITATION MINE, Gila City, U<sub>3</sub>O<sub>8</sub>

Idle

**BLACK CANYON COPPER CO**

Box 1531, Phoenix

Pres: J W England, Jr

VP: Jerome Kaye

Sec-Treas: Ben Silverman

KAY COPPER MINE, Rock Springs,

undergr., shaft, Cu, Zn, Au, Ag

Idle

**BLACK DIAMOND**  
Yuma City  
**BLACK DIAMOND**, Yuma City  
Surface & undergr., Mn  
Supt: Floyd Brown

**BLACK DRAGON**  
c/o W S Tolcott, Tucson  
**BLACK DRAGON MINE**, Pima City,  
surface, Mn  
Mgt: W S Tolcott  
Idle

**BLUEBONNET URANIUM**  
CORP  
Box 2366, Globe  
Pres: Karl Gras  
VP: Douglas Risinger  
Treas: Ernest Garrett  
**COPPER CHIEF MINE**, Stanley  
Box 30 mi E of Globe undergr.  
Co, Ag, Au, Ba  
Gen Mgr & Mine Supt: Wm W Sorenson  
Under devel

**BLUE JESTER MINES, INC**  
519 W Francis, Tempe  
**BLACK JACK MINE**, Pima City,  
undergr., Mn  
Gen Mgr: Russell Wright  
Frmr: Owen Wade  
Prod: 20 tons

**BLUE BOCK MNG CO**  
1913 W Georgia St, Phoenix  
**BLUE ROCK MINE**, Yuma City,  
Ag, Cu

**BOSDIKE, WILLIAM**  
Cave Creek  
**WARD CLAIMS**, Maricopa City, Ag

**BOSLEY MNG CO**  
312 W Dale, Flagstaff  
Pres: Howard V Bosley  
**COPPER MT MINE**, 15 mi W of  
Payson on E Verde Riv, undergr. &  
open pit, Cu, Ag  
Gen Mgr: Howard V Bosley

Gen Supt: R L Barry  
Geol: A S Walters  
Under devel

**BOYD & PORTNER**  
P O Box 1681, Wickenburg  
Part: Bert Boyd & H F Portner  
**LUCKY MICA #1 MINE**, 11 mi S of  
Wickenburg, undergr. & open pit,  
apodumene lepidolite amphibole

Be Ch Ta, Bi  
Idle

**BRACKER R J & F**  
Agua Cal  
**CROW MINE**, Maricopa City, undergr.,  
Min  
Mgt: R J Bracken  
Idle

**BRADLEY & ECKSTROM, INC**  
24 California St, San Francisco, Calif.  
Mines, variety of minerals  
(See Calif, Idaho)

**BRASHEAR MNG CO**  
Morristown  
**MIDNIGHT OWL MINE**, Maricopa  
City, surface, Li, columbitium,  
beryll  
Mgt: P C Brashear

**BUCKEYE MAR-J-ANN MNG CO**  
Oper: Sam Wallick, Box 1824,  
Goodoy & Ralph Richert,  
6109 E Exeter, Scottsdale  
**BUCKEYE APACHE MINE**, Chino  
City, Au, Ag  
Mills, at mine  
Under devel

**BUCKEYE MICA CO**  
Box 416, Buckeye  
Pres & Gen Mgr: H G Smith, Sr  
VP: H G Smith, Jr  
Sec: W Peacock  
**BUCKEYE GROUP**, 1 1/2 mi S of  
Buckeye, under gr., Mica/Muscovite,  
Sericite, Be, Feldspar  
Supt: A Duncan  
Asst Supt: C Murphy  
Frmr: C V Hill  
Prod: 100 tons

**LUCKY CHANCE 1-2-3**, 5 mi W of  
Quartzsite, Sericite  
Prod: 25 tons  
Under devel

**600-TON GRY & WET GRINDING**  
MILLS  
Supt: J G Smith, Jr  
Frmr: Wayne Watts

**BUELL, AL**  
Wickenburg  
**DESERT ROSE MINE**, Maricopa City,  
Mn  
Idle

**BULL CANYON TUNGSTEN**  
MINE  
Box 43, Yucca  
Idle

**BUNDY, C M**  
Mt. Trumbull  
**RED WING MINE**, open pit, U<sub>3</sub>O<sub>8</sub>  
Under devel

**BURNET MINES, INC**  
Box 516, Tucson  
Pres & Gen Mgr: R A Burney  
VP: B H Martin  
Sec-Treas: Lilla Burney  
**STOVE LID & AMPHITHEATER**  
MINES, 6 mi S of Oracle, undergr.,  
Pb, Zn, Cu, Ag  
Idle  
**80-TON FLOT MILL**, at Copper  
Rose claim  
Idle

**BY CHANCE MINE**  
c/o Col Frank Childs, Ajo  
Op: Von R Calloway  
**MINE**, Pima City, Ag, Cu  
Idle

**CALARI MNG CO**  
3939 Linden, Long Beach 7, Calif  
Pres & Gen Mgr: L F Albrecht  
Sec: C M Smith  
**RUTH MINE**, Box 941, Prescott, 6 mi  
S of Prescott, undergr., Zn, Pb, Cu,  
Ag, Au  
Under devel

**CAMPBELL, GEO W & SON**  
Box 70, Salome  
**BLUE EAGLE CLAIMS**, WO<sub>3</sub>  
Idle

**CAMPBELL, J A**  
Box 1145, Wickenburg  
**BIG SPAR, WEST END, JUMBO**  
MINES, Thoropar  
Under devel

**CAPITOL-SEABOARD CORP**  
Box 1847, Farmington, N Mex  
Pres: Joseph H Corbin  
Exec VP & Gen Mgr: Chas W Yetter  
Sec: Wm A Pope, Jr  
Treas: Howard L Corbin  
**SIMPSON #1 MINE**, Apache City,  
undergr., U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Prod: 15 tons  
(See Idaho, Mont, N Mex, Tex, Utah)

**WM J CAREY MNG CO**  
524 Rock Ave, Grand Junction,  
Colo  
**MINE**, Navajo Indian Reservation,  
Navajo City  
Explor  
(See Colo)

**CARLOTA COPPER CO**  
330 W Latham, Phoenix  
Pres & Gen Mgr: John L Alexander  
**CARLOTA MINE**, 15 mi W of Miami,  
surface, Cu  
Under devel

**CHARLESTON MINES, INC**  
Box 415, Tombstone  
Pres & Gen Mgr: Chas H Sulter  
**CHARLESTON LEAD MINE**, 7 mi SW  
of Tombstone, open pit, sericitic,  
An, Pb, Cu  
Prod: 40 tons  
WASHING PLANT, at mine

**CAT CLAW MNG CO**  
Miami  
Mgt: E H Kellum  
**CAT CLAW MINE**, Gila City, Cu,  
Ag, Au  
Idle

**CHESSER & CO**  
Windhoek Rock  
**URANIUM EXPLOR**, Navajo Indian  
Reservation

**CHILITO MINE GROUP**  
Box 1055, Hayden  
Owner: B C Velasco  
**MINE**, Gila City, Cu

**CHRISTOFFERSON, HANS**  
Box 80, Aguila  
**MINE**, undergr., Mn

**CIBOLA MLG CO**  
Phoenix  
Supt: C V Hill  
Prod: 100 tons

**CHRISTOFFERSON, HANS**  
Box 80, Aguila  
**MINE**, undergr., Mn

**CIDONIA MINE**, Gila City, Cu

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**Arizona****COPPER HILL MNG CO**

Box 981, Globe  
Pres: T R Black, Box 46  
Tipp City, Ohio  
VP: T R Black, Jr  
Purch Agt: L O Goodwill  
SUPERIOR & BOSTON MINES, 4 mi  
NE of Globe, undergr., Mn, Cu  
Idle

**COPPER HILL SILICA**

Globe  
COPPER HILL SILICA PIT, Gila  
Cty., surface, Cu, Si  
Mgr: E M Moores

**CORONADO COPPER & ZINC CO**

1200 Pacific Mutual Bldg.  
Los Angeles 14, Calif  
Pres: George D Dub  
VP: Henry T Mudd  
Sec: C W Six  
Purch Agt: W F Stover  
JOHNSON CAMP MINE, Box 44,  
Dragoon, 3 mi NW of Dragoon  
Mine Mgr: Fred E Gray  
Geol: R E Bergman  
Idle  
MORE & REPUBLIC MINES,  
6 mi N of Dragoon, Undergr., Cu, Zn  
Idle  
200-TON PLOT MILL, Johnson  
Camp  
Idle  
(See Calif)

**CORONADO MINES, INC**

RED MT, BUENA VISTA, GOLDEN  
ROSE & WASHINGTON MINES,  
Box 659, Nogales, undergr., Cu, Zn  
Mo, WO<sub>3</sub>, Pb, Au, Ag, pyrite

**CORONATION MNG CO, INC**

Box 387, House

Pres & Gen Mgr: Charles Milton

VP: L A Linnebaugh

Sec-Treas: H S Schneider

CORONATION MINES #1-74, Av.

Au, Cu, Zn

Idle

**CRIPPLE CREEK MNG &**

MLG CO

Box 247, Cripple Creek  
URANUM EXPLOR, Navajo Indian  
Reservation  
Under devel  
(See Colo)

**CROWN ASBESTOS MINES, INC**

Box 1443, Globe  
Pres: J E Talbot  
VP & Gen Mgr: Fred W Kreider  
Sec. Harry Ditmore  
Geol: Arthur R Still  
MINE, 55 mi NE of Globe, undergr.,  
stripping, asbestos (chrysotile soft)  
Sup: Fred W Kreider  
Idle

**CYPRESS MINES CORP**

523 W 6th St, Los Angeles 14,  
Calif  
OLD DICK MINE, Box 548, Bagdad,  
undergr., Zn, Cu  
Gen Mgr: Paul W Allen  
Res Mgr: Curtis Sundeen  
Mine Supt: D P Turberville  
Geol: Keith Coke  
Mech Eng: Herbert Dahmion  
Chf Clk: W Nelson  
Mine Eng: Robert Bonnie  
Prod: 200 tons  
Under devel  
200-TON PLOT MILL, Bagdad  
Mill Supt: L Yundt  
Assay: H Hollweg  
(See Calif, Colo)

**DASCO MINES CORP**

Box 97, Wenden  
Pres: Murphy D Wallace  
VPI Alfred T Morgan  
Sec: Harrison Doyle  
Treas: Charles Mull, Jr  
DOYLE MINE, 25 mi N of Wenden,  
open pit, Mn  
Mine Supt: Nell D Meese  
200-TON PLOT MILL, Wenden  
Mill Supt: Harold Barr  
Assay: Gilbert L Frayser

**DE LA OSSA, ALEX**

Patagonia  
KANSAS MINE, Pima Cty., surface,  
undergr., Cu, Pb, Zn

DE SILVIA, DON  
515 E Willets St, Phoenix  
STELLA MARIS #1 MINE, Pinal  
Cty., surface, Mn  
(Leased to Aris Mines Consol)

**DIAMOND URANIUM CORP**

320 Ness Bldg, Salt Lake City, Utah

U<sub>3</sub>O<sub>8</sub> Prod

**DIXIE QUEEN MNG CO**

Phoenix

Mgr: John Phillips

DIXIE MINE, Yavapai Cty, Be, Minas

**DRAGOON ZINC MINE**

Own: Flora C Hubbard, 1301 St

Mary's Rd, Tucson & Mrs W G  
Swart, 1112 High St, Alameda,  
Calif

**MINES, Cochise Cty, Za**

Idle

(Leased to C B Higgins, Box 156,  
Bennett)

**DRAKE MNG CO**

Black Canyon

**KAY COPPER MINE, Yavapai**

surface, undergr., Cu

Mgr: Kenneth Clark

Idle

**DUNCAN, WALTER MNG CO**

Box 1468, Cortez, Colo

Pres: J Walter Duncan, Jr

Gen Mgr: Charles R Butler

CISCO MINE, Lukachukai Mts, Apache  
Cty, 33 mi SW of Shiprock, N Mex.,  
undergr., U, V

Idle

**DUTCH PLAT GROUP**

Yucca

Own: Birt J Jackson

MINE, Mohave Cty, undergr., WO<sub>3</sub>,  
Au, Pb, Ag

Idle

**DUVAL SULPHUR & POTASH CO**

17th Flr, Mellie Esperanza Bldg,  
Houston 2, Texas

Pres: W P Morris

VP: G E Atwood

VP & Treas: Eugene German

Sec: V J Thornhill

**COPPER DIVISION-ESPERANZA**

MINE, Box 1127, Tucson 2,  
open pit, Cu, Mo

Res Mgr: E G Atwood

Asst Res Mgr: B G Messer

Geol: D M Clippinger

Metal: C H Curtis

Mine Eng: Tom Janic

Mech Supt: H A London

Under devel

**10,000-TON PLOT MILL, at mine**

Mill Supt: I B Phillips

(See Texas)

**DYE & BATHRICK - A PARTNERSHIP**

Box 1068, Kingman

Gen Mgr: R L Dye

Asst Gen Mgr: J H Bathrick

**BORIANA MINE, Yucca, 18 mi NE**

of Yucca, dump, WO<sub>3</sub>, Cu, Ag

Idle

**PLOT-MILL, at mine**

Frms: C C Strouse

Idle

**COPPER WORLD MINE, Yucca, Ag,**

Zn, Cu, Pb

Under devel

(Leased to Mt States Mng Co)

**EL JAKARTA MNG CO LTD**

Box 42, Tumacacori

Pres, Own & Gen Mgr: D D Burcher

**A-B MINE, Josephine Canyon,**

undergr., Cu, Pb, Au, Ag

Geol: E R Hill

Min Supt: F O Otero

Min Eng: D D Burcher

Under devel

**EL PEQUITO MNG CO**

P O Box 812, Apple Valley, Calif

U<sub>3</sub>O<sub>8</sub> Prod

**EMERALD ISLE MINES**

Box 174, Chloride

Op: C G Patterson

**MINE, Chloride, Cu**

Idle

**EMPEROR - DUCHESS MINES CO, INC**

Fairfield, Idaho

Pres: Ben Lesswell

VP: Chas Fuller

**Sec-Treas: Roland Baldwin**

Dir: Laurence Green, Sells

**MINE at Sells, Cu, Ag**

Supt: M Green

Idle

**EVANS, B**

Agua

**LIONS DEN & WISCONSIN MINES,**

Maricopa Cty, Mn

**EVANS & EVANS**

Aquila

**NEEDLE EYE MINE, Mohave Cty,**

surface, Mn

Mgr: P T Evans

Under devel

**EVERETT & RICHARDSON**

Duncan

**EUREKA #3 MINE, fluor spar**

Idle

**FOSTER, L H**

Box 614, Duncan

**EUREKA MINE, Greeley Cty,**

fluor spar

Idle

**FOUTZ & THOMAS**

Box 218, Apache Cty

**MITTEN & MONUMENT #1 MINE,**

Apache Cty, surface, undergr., U<sub>3</sub>O<sub>8</sub>

Mgr: T J Fraka

Idle

**GAR PAC, INC**

112 N Central, Phoenix

Pres: Pace Foster

VP & Ass't Gen Mgr: Garlin Davis

Sec: Ray Burgi

Treas: Pat Foley

Idle

(See N Mex)

**GEN DEVEL & MNG CO**

530 N 42nd St, Phoenix

Pres: Herman D Rhea

VP: Walter Weisback

Sec: Frank H Lauerman

**HOME STRIKE MINE, Mogollon,**

undergr., Au, Ag, Pb, Cu

Under devel

**MORNING GOLD MINE, Patagonia**

Under devel

**100-TON MILL, Patagonia**

Mill Supt: Simon S Schencky

Ass't Mill Supt: Willis V Rhea

Idle

**GENERAL MNG CORP**

2822 Sunset Blvd, Los Angeles,  
Calif

Pres: E J Speaks

VP: Don Carte

Sec: Allan Thody

Treas: Howard Mallring

**MINE, Yuma Cty, undergr., Mn**

Fred: 30 tons

(See Calif)

**GIACOMA BROS**

Box 546, Glendale

Mgr: A P Giacoma

**CASTELLO GROUP, Au****DEFIANCE MINE, Cochise Cty,**

undergr., surface, Pb, Zn

**GIBRALTAR MINERALS**

Kayenta

Mgr: Robert Payne

**BOOT JACK MINE, Navajo Cty,**

U<sub>3</sub>O<sub>8</sub>

Prod: 30 tons

**GIBRALTAR URANIUM & OIL CO**

Box 302, Grand Junction, Colo

Pres: I W Andrews, Jr

**ROUGH ROCK #1, Navajo Reservation,**

Chinle, undergr., U<sub>3</sub>O<sub>8</sub>, V

Gen Mgr: James A Geddes

Geol: Joe Bowman

Prod: 30 tons

**GILDED CO**

Agua

Mgr: V D Standley

**MINE in Maricopa Cty, Mn**

Idle

**GILBERT, D C**

Patagonia

**ESTELLA MINE, Santa Cruz Cty,**

surface, undergr., Cu, Pb, Zn

**C G GLASSCOCK-TIDELANDS OIL CO**

1801 Wilson Tower, Corpus Christi,  
Texas

**BIG BANANA MINE, Box 38, Sells,**

undergr & open pit, WO<sub>3</sub>

Mgr: M F McKnight

Geol: Gene Dedman

50-TON GRAV MILL, Pima Cty

**GLOBE - TOLEDO MNG CO**

528 Spitzer Bldg, Toledo, Ohio

**GLOBE-TOLEDO MINE, Gila Cty,**

Cu

Idle

**GLOBE URANIUM, INC**

Globe

**SUE MINE, Gila Cty, surface,**

undergr., U<sub>3</sub>O<sub>8</sub>

Mgr: W W Carson

Idle

**GODFREY & GODFREY**

San Manuel

Oper: Raymond Godfrey, Grand

Godfrey

**BLACK BEAUTY MINE, Pinal Cty,**

Mn

Under devel

**GOLCONDA CORP**

Chloride

Mgr: Pat Patterson

**GOLCOSDA MINE, Mohave Cty,**

Zn, Au, Ag, Pb

Idle

**GOLD BASIN PLACERS**

c/o Joe Jackson, Box 8,

Quartzsite

PLACERS, Yuma Cty, Au

Idle

**GOLDEN CROWN MNG CO**

(MERGED WITH WESTERN GOLD &

URANIUM INC, SEE THAT CO)

**GOLDEN RULE MINE**

Dragon

Co-Own: M V Lee

MINE, undergr., Au, Ag, Pb

Idle

**GOLDFIELD MINES, INC**

Mesa

Own: Hugh Nichols

Mgr: T R Russell

**GOLDFIELD MINE, NE of Mesa,**

surface, Au

Idle

**125-TON CYANIDE MILL**

(Leased to Hebron & Landis)

**GRAY FOX TUNGSTEN**

c/o E K Mitchell, Congress

Idle

**GREEN STREAK MINE**

Own: R L Fleming, House

Op: L A Appling

MINE, Yuma Cty, Au, Ag, Cu

Idle

**GUNSITE BUTTE URANIUM CORP**

26 W Broadway, Salt Lake City,  
Utah

Pres: Milton V Backman

VP: Claude Lacy

Sec: M J Florence

Treas: Nick Vrontikis

THOMAS #1, Marble Canyon, undergr.,  
U<sub>3</sub>O<sub>8</sub>

Gen Mgr: L J Fyane

Eng: Ralph Karsten

Idle

**H & H MINING CO**

Yucca

Gen Mgr: Earl Heath

**MARY NEVADA MINE, undergr., Ag**

**HERALD MNG CORP**  
921 Simms Bldg, Albuquerque,  
N Mex

**PURPLE PANSY**, Maricopa Cty,  
open pit, Mn  
Idle

**HILTON, E P**  
Box 1308, Tucson  
STATE OF MAINE & LONE MTN  
MINES, undergr., Pb, Ag, Cu  
Idle

**HOLLY MINERALS CORP**  
(See SUBSID AMERICAN FIBER CORP)

**HOLMESTAKE MNG CO**  
Box 308, Winterhaven, Calif  
SONORA GROUP, Yuma Cty, Pb, Ag  
Idle  
(See Calif)

**HOLY CROSS MINE**  
1302 Casa Grande Rd, Tucson  
MINE, Pinol Cty, Ag, Cu  
Idle

**HOOPES & CO**  
Globe  
Mgr: K L Hoopes  
MINE, MILL in Gila Cty, limestone

**HOWARD MNG CO**  
House  
**JACKY #1 & 2 MINES**, Yuma Cty, Cu  
Idle

**HOYT, PHILIP S & SON**  
P O Box 2040, 543 E Culver,  
Phoenix

Own: Philip S Hoyt, Sr &  
Philip S Hoyt, Jr  
MICA MINES, Mohave, Maricopa,  
Yuma Cty, undergr. & surface,  
mica, rare earths  
Under devel

**HUNTLEY INDUSTRIAL MIN,**  
INC  
Box 305, Bishop, Calif  
Treas: L G Hummel  
MERLO MICA MINE, Kingman  
Idle  
(See Calif)

**INDUSTRIAL URANIUM CO**  
Phoenix  
Mgr: Bill Doolin  
NATIONAL MINE, Maricopa Cty, Hg  
SUNLIGHT & STARLIGHT MINES,  
Navajo Cty, U<sub>3</sub>O<sub>8</sub>

**INSPIRATION CONS COPPER**  
CO  
25 Broadway, New York 4, N Y

Pres: P D I Honeyman  
VP & Sec: H M Jacob  
Treas & Ass Sec: E F Wendt  
Dir of Purch: A B Harris  
INSPIRATION MINE, Inspiration,  
surface, Cu  
Ass Sec Mgr: H C Wood  
Ass Sec & Ass Treas: C G Stess  
Plant Sup: C B Kettlering  
Geol: E F Reed  
Mech Eng: A H Neal  
Met: P M Musgrave  
Elec Eng: Mark Smith  
Auditor: E M Bredwell  
Purch Ag: E F Dolin  
Power Pl Sup: T E Tizard  
Mine Sup: J R Waite  
Ass Mine Sup: T E Bilesen  
Open Pit Frm: T M Andersons  
Ch Min Eng: J L Carne  
Prod: 16,000 tons  
CHRISTMAS MINE, Christmas,  
undergr., Cu  
Gen Sup: B W Whitney  
Mine Sup: N G Thomson  
Mine Frm: M R Flairz  
Geol: J T Eastlick  
Under devel  
LEACHING PLANT AND CONC,  
Inspiration  
Plant Frm: W D Schrader  
Acid Plant Frm: W H Parker  
Conc Sup: K L Power  
Conc Frm: A L Welch

**INTERNATIONAL MINERALS &**  
**CHEM CORP**  
CONS FELDSPAR DEPT, 20 N Wacker  
Dr, Chicago 6, Ill  
VP: Norman J Dunbeck  
Gen Mgr: James E Castle  
Mgr: E W Koenig  
Ass Mgr: Phil Blaxovic, Jr  
Sales Mgr: W K Burris  
**FELDSPAR MINE**, Box 229,  
Kingman, surface  
Sup: J W Allen  
150-TON MILL, E KINGMAN, fine

**grinding**  
Sup: J W Allen  
(See Colo, Fla, Ill, Maine, Miss,  
N C, Okla, S D, Tenn, Va)

**INTERNATL ORE CORP**  
Wickenburg  
MINE, Maricopa Cty, surface, Hg  
Mgr: D P Simpson  
Idle

**INTERNATIONAL RANWICK LTD**

2810-25 King St W, Toronto,  
Ontario, Canada  
Pres: J D Bateman  
VP: J M Eason  
Sec: A C Callow  
Treas: J T McWhirter  
COPPER BASIN MINE, Prescott  
Idle

**INTERNATL SMELTING & REFINING CO**  
Miami  
3,000-TON CUSTOM SMELTER,  
Inspiration  
Sup: Harold Foard  
Ore Buyer: Clifton P Smith

**INTERSTATE MNG & EXPLOR CORP**  
1038 1st Nat'l Bank Bldg, Denver 2,  
Colo

Pres: S R Mahoney  
VP & Treas: L H Seagrave  
Sec: W G Dillon  
VP: B C Heath  
PROSPECT MINE, undergr., U<sub>3</sub>O<sub>8</sub>  
Gen Mgr: G C Ridland  
Under devel  
(See Colo)

**INTERSTATE OIL & DEVELOPMENT CO**  
P O Box 1325, Wickenburg  
U<sub>3</sub>O<sub>8</sub> Prod

**IRON GAP URANIUM CORP**  
Tempe  
IRON GAP MINE, Gila Cty, surface,  
U<sub>3</sub>O<sub>8</sub>, Cu  
Mgr: B H Martin  
Idle

**ISBELL CONST CO**  
Box 1710, Phoenix  
ESPERANZA COPPER MINE, Tucson,  
contract mng for Duval Sulphur &  
Potash Co  
Sup: John Wright  
MINE, Cameron, U<sub>3</sub>O<sub>8</sub>, contract mng  
for Rare Metals Corp  
Sup: Jim Shehan  
(See Idaho, Nev, Utah, Wash)

**JAMES STEWART CONST CO**  
Box 347, Tombstone  
Sup: Chas H Shuster  
CHARLESTON MINE, Cochise Cty,  
Pb, Zn  
Under devel  
MILL, at mine

**JACQUAYS MNG CORP**  
1219 S 19th Ave, Phoenix  
Pres & Gen Mgr: D W Jacquays  
VP: G A Jacquays  
Sec-Treas: Ethelyn Jacquays  
Assn Gen Mgr: Alvin Gerhardt  
Gen Sup: Leroy Wood  
REGAL & ASBESTOS KING MINES,  
Box 338, Globe, 47 mi N of Globe,  
undergr., asbestos  
Mine Sup: F H Padgett  
Prod: 50 tons  
15-TON GRAV MILL, Globe  
Mill Sup: W Meyers  
CONGRESS MINE, 3 mi N of Congress  
Jt, undergr., Au, Ag, WO<sub>3</sub>, U<sub>3</sub>O<sub>8</sub>  
Under devel  
(Leased from E A Colburn, Jr)

**JOHNSON MNG CO**  
55 N Matlock St, Mesa  
Mgr: A H Johnson  
RARE METALS MOLY MINE &  
BLACK COPPER GROUP, 4 mi S of  
Kelvin, undergr., Cu, Au, Ag, Mo,  
U<sub>3</sub>O<sub>8</sub>  
Idle

**K B R MNG & DEVELOPMENT CORP,**  
INC  
Box 168, Yarnell  
Pres & Purch Agt: Jerold P Kolar  
VP: Claude Brittain  
Sec: P A Brittain  
Treas: Elsie Kolar  
STAR OF ARIZONA, ELSIE'S JACK  
POT #1 & #2 MINES, Kolar Group,  
undergr., Cu, Ag, Cu, Pb  
Gen Mgr: C A Brittain  
Idle

**KACHINA URANIUM CORP**

307 W McDowell Rd, Phoenix  
Pres & Gen Mgr: Carl C Adair  
VP: A T Laprade, Jr  
Sec: V W Adair  
JEEPSTER #1, KACHINA #6 &  
MONTEZUMA #1 MINES, Cameron,  
open pit, U<sub>3</sub>O<sub>8</sub>  
Geol & Mine Sup: Page Blakemore  
Prod: 15-20 tons

**KAIBAB URANIUM CO INC**  
908 Odd Fellow Bldg, Indianapolis,  
Ind  
U<sub>3</sub>O<sub>8</sub> Prod

**KENNECOTT COPPER CORP., RAY MINES DIV**

Ray  
Gen Mgr: A P Morris  
Assn Gen Mgr: H J O'Carroll  
Compt: C R Knous  
Purch Agt: N E Guyer  
Adm Asst: C L Hoyt  
Safety Eng: R A Willoughby  
Ind Eng: A T Shukas  
RAY MINES, open pit, Cu, Ag  
Gen Mine Sup: J C Van De Water  
Geol: J Werth

Asst Pit Sup: R W Ballmer  
Ind Rel Dir: J E Peterson  
Ass Mech Sup: A L Dickerson  
Pit Frm: W Taylor  
Ch Eng: H. W. Bishop  
Ch Elect: L J Miller  
Prod: 16,000 tons  
16,000 - TON FLOT MILL, Hayden,  
23 mi SE of Ray  
Sup: J L Stevens  
Ass Sup: G P Sewell  
Master Mech: P M Hoskin  
Met Eng: D V Balbiati  
Plant Eng: R C Johnson  
Ch Elect: C C Fanning  
SMELTER, Hayden  
Project Mgr: Frank Woodruff  
Under const  
(See Nev, N Mex, NY, Utah)

**KENNEDY McGEE MNG CO**  
Shiprock, New Mexico  
U<sub>3</sub>O<sub>8</sub> Prod

**KENT MINES, INC**  
c/o Jim Kent, Box 87,  
Yarnell

**BLACK DIKE MINE**, Au, Pb, Ag, Mo

**KERR - McGEE OIL INDUST, INC**

**NAVAJO URANIUM DIV**  
Box 608, Shiprock, New Mex  
DOVE MINE, Cove, undergr.,  
U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Gen Mgr: M F Bolton  
Geol: Billy Stevens  
Mine Sup: Jack Landon  
Mine Frm: Vernon Willden  
Prod: 150 tons  
MILL, Shiprock, N Mex  
500-TON MILL, Shiprock  
Sup: Dick Shreve  
(See Colo, New Mex, Okla, Wyo)

**JIMMIE KING**  
c/o T E Scanlon & Assoc, P O Box  
601, Farmington, N Mex  
U<sub>3</sub>O<sub>8</sub> Prod

**KINSEY, T C**  
Mammath  
CRESCENT MINE, Pinol Cty,  
surface, Mn  
Mgr: Frank Parker  
Idle

**KNOX - ARIZONA COPPER MNG CORP**  
8867 Ladue Rd, St Louis 24, Mo  
Pres: Wm A Knox  
VP: Tom Keyes  
Sec-Treas: Wm A Knox  
COPPER MT MINE, Ajlo  
Geol: Edward Clark  
Under devel

**KYLE ASBESTOS MINES OF ARIZ**  
Box 302, Globe  
SLOAN CREEK, LUCKSTRIKE MINES  
Op: Roger Q Kyle

**LA GOLDRINDRA MINE**  
Dragoon, open pit, Cu, Pb, U<sub>3</sub>O<sub>8</sub>,  
V<sub>2</sub>O<sub>5</sub>, Mo  
Owner: H V Lee  
Idle

**LEAD KING MINES, INC**  
701 E 9th St, Las Vegas, Nevada  
Pres & Gen Mgr: Eugene G Moyse  
VP: Frank LaGrange  
Sec: William B Byrne

**RUTH & RATTAN MINES, San**  
Francisco Mng dist, Mohave Cty,  
undergr, Au  
Idle

**LEAD & ZINC CORP OF AMER**

Box 106, Globe  
Pres: Grady B Gullede  
VP: J B Williamson  
Gen Mgr: Ray Pointer  
DEN HUR MINE, 15 mi NW of Klondyke,  
undergr, Pb, Zn, Cu, Ag  
Idle

**LEON, MILTON**  
208 Wright Bldg, Tulsa 3, Okla  
UNCLE SAM MINE, Box 659,  
Nogales, 5 mi NE of Nogales,  
undergr, Au, Ag, Pb  
Under devel

**LEROY MINE**  
Cochise Cty  
MINE, Cochise Cty, undergr &  
surface, Pb, Ag  
Mgr: Gwida Bloomer, Manhattan  
Beach, Calif  
Idle

**LEWISOHN COPPER CORP**  
128 N Church, Tucson  
Pres & Treas: Richard E Chilson  
VP: Boyd M Morse  
PEACH MINE, Helvetica, 35 mi SE  
of Tucson in Santa Rita Mts, open pit,  
Co  
Idle

**LIEBERMAN ENTERPRISES, INC**  
1500 W Avn Way, Tucson  
Own: Donald K Lieberman  
125-TON GRAV FLOT MILL  
Idle

**LIND, C L**  
Chloride, Box 10  
COUSIN JACK COPPER, TYLER,  
LADY BUG, EVAHOM MINES &  
CLAIMS  
Under devel

**LUCKY MNG CO**  
Box 1662, Parker  
LUCKY MINE, Yuma Cty, Cu  
Idle

**LUCKY STOP MNG CO**  
Young Rd, Globe  
Partnership: Johnnie Brunson,  
William Brunson  
Ed Conway  
Hugh Nichols  
LUCKY STOP MINE, Gila Cty,  
undergr, U<sub>3</sub>O<sub>8</sub>  
Mgr & Mine Sup: Johnnie Brunson  
Idle

**LUCKY SWED MNG CLAIM**  
Box 2231, Warren  
Own: George Erickson  
CLAIM, 6 mi E of Lowell, undergr,  
Idle

**M & M MNG CO**  
Pampa, Texas  
U<sub>3</sub>O<sub>8</sub> Prod

**M & S COPPER CO**  
Box J, Casa Grande  
REWARD MINE, Pinol Cty, Pb, Zn  
Idle

**PETER C MAC KERYIE**  
c/o Geol Delivery, Apache Jt  
U<sub>3</sub>O<sub>8</sub> Prod

**MAGIC MINE**  
Wenden  
Au  
Ops: E J Johnson, T E Warren  
Idle

**MAGMA COPPER CO**  
Box 37, Superior  
Pres & Gen Mgr: W P Gees  
Ass: F G Sarver  
Ass Gen Mgr: J F Buchanan  
VP & Sec: Roy Bonebrake

Treas: W P Schmid  
Purch Agt: Ray Medlock  
Aud: P S Franklin  
MAGMA MINE, Superior, undergr,  
Cu, Ag, Au  
Gen Mgr: Darrell Gardner  
Ass Gen Mgr: J F Buchanan  
Gen Sup: G L Augustadt  
Geol: R N Webster  
Mech Eng: Howard Johnston  
Elec Eng: T P Trask  
Frm: Cecil Tomerlin  
Eng: B Van Voorhis  
Prod: 1,500 tons

**Arizona****1,500-TON PLOT MILL, Superior**

Supt: Halder Ross  
Frm: M C Cooksey  
Assay: Martin Harris  
REVERE SMELTER, Superior  
Supt: E J Caldwell  
Assy Supt: C L Soule  
Prod: 48,000,000 lbs per year

**MAGMA KING MANGANESE MINE, Superior**

MIN in Finlay City, Mn, Ag  
Mgr: Ralph Pomeroy  
Idle

**MANGANESE KING MNG SYN**

Box 335, House  
Pres: R N Doyle  
VP & Sec: Harrison Doyle  
Gen Mgr: L A Appling  
MANGANESE KING MINE, 35 mi NE of House, surface

**MANHATTAN CONSOL MINES DEV CO**

Box 35L, Tonopah, Nevada  
Pres: J Fred McCollough  
Sec: Nick J Barbarich  
SCRIBNER MINE, Box 101, Elfrida, 25 mi NW of Elfrida, undergr, pb, Ag, Au  
Idle

**MARAVILLA MINERALS CORP**

153 S Robertson Blvd, Beverly Hills, Calif  
MONTANA MINE, Santa Cruz, Co, Pb, Zn, Ag  
Gen Mgr: Ross K Oliver, Box 134, Nogales  
Under devl

**MARCY-SHENANDOAH CORP**

1001 1/2 N Main Ave, Durango, Colo

Pres & Gen Mgr: S Stokes Tomlin, Jr  
VP & Geol: E M Barge  
Sec: R M Schell  
Treas: Robert R Snodgrass  
JACK DANIELS MINE, Cameron, open pit, U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Mine Supt: G R Green  
Assy Mine Supt: F E Peasee  
Prod: 70 tons  
See Colo, Utah

**MASSINGALE, LON**

Casa Grande  
SILVER REEF, #1 MINE, Pinal City, undergr, Pb, Ag, Cu  
Mgr: Lee Huise  
Idle

**MAYNARD & RYAN**

402 N Humphrey, Flagstaff  
U<sub>3</sub>O<sub>8</sub> Prod

**McCARY BEACOM CO**

2155 East 7th St, Los Angeles 23, Calif

U<sub>3</sub>O<sub>8</sub> Prod

**McFARLAND, E W**

Nogales  
MOLLAND MINE, Santa Cruz City, surface, undergr, Cu, Pb, Zn

**MC FARLAND & HULLINGER**

915 N Main St, Box 238, Toole, Utah  
Own: F G McFarland & S R Hullinger  
SAN XAVIER MINE, Box 61, Tucson, undergr, Pb, Zn, Cu  
Gen Supt: Wilmer D Nelson  
Geol & Mine Eng: Gerald W Irwin  
Prod: 90 tons

400-TON MILL, Sahuarita

Supt: K L Erickson

(See Colo, N Mex, Utah)

**MC WAY MNG & MILL CO**

Wendan

THREE MUSKETEERS MINE, Yuma

Cty, surface, undergr, WO<sub>3</sub>

Mgr: Harvey Moore

**MEADER, S**

Quartzite

PLUMOSA URANIUM MINE, Yuma

Cty, U<sub>3</sub>O<sub>8</sub>  
Under devl

**MELLINGER, PORT B**

Box 347, North Lima, Ohio

MT SPRING MINE, Bagdad, undergr,

Pb, Zn, Ag, Au, Cu  
Under devl

**METATE ASBESTOS CORP**

Box 11, Globe

Pres & Gen Supt: Charles Robt Neal

VP & Ass't Gen Mgr: Chas Ross Neal

Gen Mgr & Sec: Jack L Neal

Treas: R A McNabb  
APACHE & LUCK SEVEN MINES, San Carlos Apache Indian Reservation, undergr, asbestos  
Mine Supt: Charles Palmer  
Assy Supt: Harvey Collins  
Prod: 16 tons  
BLUE MULE MINE, Bear Canyon, San Carlos Apache Reservation, undergr, open pit, asbestos  
Supt: G W Haynes  
Prod: 1 ton  
B-TON MILL, at Blue Mule mine Mill, at Apache mine  
16 tons copped ore per day

**METBEL MNG & EXPL CO**

14471 E Carnell, Whittier, Calif  
U<sub>3</sub>O<sub>8</sub> Prod

**MEX AIR URANIUM CO**

Gen Del, Monticello, Utah

U<sub>3</sub>O<sub>8</sub> Prod

**MIDNIGHT & MIDNIGHT**

ENT #1 MINES

Box 1032, Nogales

Own: Val & Margaret Cason

Idle

**MINERAL MT M & M CO**

330 E 14th St, Tempe

Pres: C M Miller

VP & Gen Mgr: L L Boyer

GORHAM-HALL GROUP, 20 mi SW

of Superior, Pb, Ag, Zn, undergr

WOODPECKER MINE, Pinal City,

Au, Ag, Pb

Idle

SILVER QUEEN GROUP, 20 mi SW

of Superior, Pb, Ag

Idle

**MINES CONTRACTING, INC**

Wickenburg

(See Calif)

**MONAHE MNG & MLG CO**

Box 1106, Wickenburg

Pres: H F Lynn

VP: G S Borden

Sec & Treas: Frank Kohler

Purch Agt: Jack Evans

Mgr: W R Easley

BOX GARDEN MINE, near Wicken-

burg, open pit, Mn

mining by contract

Geol: Earl Whitney

Mkt: Robert Kidd

Prod: 200 tons

600-TON HEAV-MED MILL, tables

Artillery Peak

Mill Supt: Robert Platt

Mill Frm: Harry Bevington

Assayer: Joe Girard

350-TON PLOT & HEAV-MED

MILL, tables, Wickenburg

Mill Supt: Gee Johnson

Assayer: Lyle Schwader

SINTERING PLANT, Wickenburg

**MONICA GROUP**

Box 27, Yarnell

Own: C D Howe, John L Riggins,

L J Jaycox

MINE, Yavapai City, Au

**MONTANA - ARIZONA MNG CO**

Box 16, Lukeville

Mgr: Charles R Anderson

JEFF MILTON OR VERDE MINE, Cu

Idle

**MORROW MNG ASSOC**

Wickenburg

JUMBO MINE, Maricopa Cty,

surface, Li

Mgr: Robert Pinkerton

**MY STATES METALS CO**

Tucna

Pres & Gen Mgr: G A Freeman

COPPER WORLD MINE, 15 mi NE

of Yucca, undergr, Cu, Zn

Idle

**COPPER WORLD MILL****MT STATES URANIUM CO**

1303 Kennedy, Grand Jct, Colo

Pres: A K Wilson, Jr

SAN JUAN MINE, WO<sub>3</sub>

Idle

**MUD MESA MNG CO**

Cortez, Colo

U<sub>3</sub>O<sub>8</sub> Prod

**MACHEENBETAH, FRANK**

10 N Orchard Ave, Farmington,

N Mex

U<sub>3</sub>O<sub>8</sub> Prod

**NASH MINES**

406 Nash Blvd, Austin, Tex

Own: Jas P Nash

BONANZA, HOLLAND, KANSAS,

ESTELLA, BELMONT, MAINE,

NEW YORK, INDIANA, DUQUESNE,

& EMPIRE MINES, Patagonia mng

dist

Gen Mgr: D C Gilbert

Gen Supt: D C Gilbert

Gen Mgr: D C Gilbert

Elec Eng: A G Beebower  
 Mine Supt: J E Thrumond  
 Ass't Mine Supt: J Sierachowski  
 Mine Frm: D A Rich  
 Mine Eng: M D Martin  
 3,500-TON FLOT MILL; at mine  
 Mill Supt: G A Komadina  
 Mill Frm: Maurice Cunliffe  
 Assay: P Flores  
 (See Calif.)

PINAL COPPER MINES  
 c/o Herman D Rhea, Florence  
 PINAL COPPER MINE, Pinal Cty.,  
 Cu  
 Idle

POWER, J F

Yuma  
 CIBOLA #7 MINE, Yuma Cty.,  
 surface, undergr., Ma  
 Mgr: C J Hanshaw

BARE METALS CORP OF  
 AMERICA  
 1st Security Bldg, Salt Lake City 11,  
 Utah  
 Supt of Oper: A A McKinney  
 Prod: 110 tons  
 RAMCO PROPERTIES, Cameron,  
 Navajo Indian Reservation, Coconino  
 Cty, open pit, U<sub>3</sub>O<sub>8</sub>  
 Gen Supt: James McFarlane  
 Mine Supt: J C McFarlane  
 Eng: W L Fugate  
 Prod: 180 tons  
 260-TON ACID-LEACH MILL, Tuba  
 City  
 Mill Supt: S M Runke  
 Ass't Mill Supt: L O Davis  
 Mill Frm: L W Head  
 Met: W A Griffith  
 Chemist: G L Botts  
 (See Idaho, Calif., Utah)

RAY MNG CO  
 c/o Vernon Willdene  
 Shiprock, N Mex  
 BLACK #1 MINE, Anache Cty.,  
 surface, undergr., U<sub>3</sub>O<sub>8</sub>, V  
 Idle

RED BLUFF MNG CO  
 Young Rd, Globe  
 RED BLUFF MINE, undergr., U<sub>3</sub>O<sub>8</sub>  
 Gen Mgr & Mine Supt: Carl Larsen  
 idle

RED CLOUD GROUP  
 Own: M L Lynch, John W Lavier,  
 Prescott  
 MINE, 8 mi SW of Bagdad, diamond  
 drill explor.  
 Idle  
 (Sub-leased to Cypress Mines Corp)

REYMERT EXT SILVER  
 MINES  
 Box 521, Superior  
 Pres & Gen Mgr: Norman De Vaux  
 VP: Ray N Matzinger  
 Sec: Neil McGinnis  
 Gen Sup: Fred A Bennett  
 REYMERT MINE, 7 mi W of  
 Superior  
 Idle

RICO MNG CO  
 Aquila  
 Mgr: P D Evans  
 IRUN CHANCEREL MINE, Yavapai  
 Cu

RIO DEL MONTE MINES, INC  
 Salme  
 Pres & Gen Mgr: O K Gilliam  
 VP: Emil Anderson  
 Sec: E V Ecke  
 HI-DEL MONTE MINE, 4 mi SW  
 of Salome, undergr., Au, Ag, Cu, Pb  
 Idle  
 GHAV MILL

ROXY ENTERPRISES  
 201 N Stone Ave, Tucson  
 Pres: Louis Sirrote  
 PITTSBURGH GROUP, Santa Cruz Cty.,  
 Cu, Zn, Pb, Ag  
 Under devel

S W MNG INDUSTRIES  
 1618 S Sixth Ave, Tucson  
 SERASIO MINE, Cu  
 Idle  
 (Leased from Mike Serasio)

SABER MNG CO  
 c/o R M Rutledge, Safford  
 Mgr: R M Rutledge  
 BLACK HAWK MINE, Graham Cty.,  
 Mn  
 Idle

BALERNO METALS CORP  
 c/o J W Crotry, Patagonia  
 ALICE BLUE GROUP, Santa Cruz  
 Cty, Cu  
 Idle

BAN MANUEL COPPER CORP  
 Box 5417, San Manuel  
 Pres: W P Goas  
 VP & Sec: R C Bonebrake  
 Treas: W P Schmidt  
 Purch Agt: J A Gardner  
 SAN MANUEL MINE, undergr., Cu,  
 Mo, Au, Ag  
 Gen Mgr: F H Buchella  
 Ass't Gen Mgr, Oper: J F Buchanan  
 Mine Supt: C L Pillar  
 Ass't Supt: E K Staley  
 Geol: J D Peletier  
 Mech Supt: C A Baison  
 Met: H K Burke  
 Ch Mng Eng: H J Steele  
 Mine Frm: C F Cigiana  
 Prod: 30,000 tons  
 30,000-TON FLOT MILL  
 Supt: E V Given  
 140,000,000 LB REVERB SMELT.  
 Supt: R C Wilson  
 Gen Frm: L Redmond  
 Ass't Supt: John Cullom

SANDERS MINE  
 Sanders  
 Mgr: C A McCarron  
 MINE in Apache Cty, bentonite

SAN RAMON MINE  
 4834 E Broadway, Tucson  
 Own: Bob Cruse  
 Mine, 16 mi NW of Patagonia,  
 undergr., Pb, Cu, Ag, Zn  
 Idle

SANDERS, WILLIAM W  
 Portal  
 LEADVILLE MINE (COCHISE CTY),  
 Pb

SANTA CRUZ COPPER CO  
 2207 E Waverly Tucson  
 Pres: D M Stranahan  
 VP: L J Lichity  
 Sec: Victor H Verity  
 Treas: A K Barranco  
 VOLCANO & SUNNYSIDE MINES,  
 Patagonia, Cu  
 Idle

SAN MIGUEL MINE, Salome  
 Idle

SANTA TERESA MNG CO  
 Safford  
 Sec: Paul Merrill  
 SANTA TERESA & FAIRVIEW  
 MINES, Graham Cty, Pb  
 Idle

SCHOLZ, E A & CAZIER, J H  
 Bagdad  
 COPPER KING MINE, 7 mi S of  
 Bagdad, undergr., Zn, Cu  
 Under devel  
 (Leased to Wah Chang Mag Corp.,  
 Bishop, Calif.)

SEIFERT & SMITH  
 Aguila  
 BLACK QUEEN MINE, Maricopa  
 Cty, surface, undergr., Mn  
 Mgr: Fred Seifert  
 Idle

SEIN FEIN MNG CO  
 Klondike  
 Pres: Dean Nicholson  
 MINE, Aravaipa dist, undergr.,  
 surface, Au, Ag, Cu, Pb  
 Idle

SELLS, CATO  
 P O Box 253, Farmington, N Mex  
 U<sub>3</sub>O<sub>8</sub> Prod

SEQUOIA MNG CO  
 218 Palm Ave, Imperial Beach,  
 Calif  
 U<sub>3</sub>O<sub>8</sub> Prod

SEVIER MINERALS CO  
 Box 186, Richfield, Utah  
 Pres: Wm R Robertshaw  
 Gen Mgr: Wm Howard  
 GOLDEN GEM MINE, 12 mi N of  
 Kingman, undergr., Au, Ag, Zn,  
 Pb, Cu  
 Mine Supt: Wm Howard  
 Mine Frm: Charles E Barnes  
 50-TON FLOT MILL, at mine  
 Assay: William Kern

SHANNON MNG CO  
 Box 301, Tombstone  
 Pres: M Blumberg  
 VP: L Blirkey  
 Sec: J Flory  
 SHANNON MINE, Cochise Cty,  
 undergr., Cu, Zn, Pb  
 Gen Mgr: J W Faust  
 Mine Supt: L J Conley  
 Mine Frm: J Perotti  
 Prod: 75 tons  
 Idle

SHAPLEY PROCESSING CO  
 1448 E Town & Country Lane,  
 Phoenix  
 Own & Op: Cooper Shapley, Jr  
 MINE, undergr., open pit, CaF<sub>2</sub>  
 Idle  
 MILL, 22 mi SW of Agua, Ariz

SHATTUCK DENN MNG CORP  
 120 Broadway, New York 5, NY  
 Pres: Thomas Rardon  
 VP: S S Shattuck  
 Exec VP: Thomas V Tossi  
 Ass't VP: D M Kentro, T W Newell  
 Sec-Treas: John A Moss  
 IRON KING MINE, Humboldt, undergr.,  
 Zn, Pb, Au, Ag, Cu  
 Gen Mgr: D M Kentro  
 Met Supt: A W Jeffers  
 Chf Eng: L Bomhardieri  
 Mech Eng: R Waples, Jr  
 Chf Clk: W Richardson  
 Purch Agt: J G MacGregor  
 Mine Supt: Elmer Tomkinson  
 Mine Frm: Claude Apperson  
 1,100-TON FLOT MILL, at mine  
 Supt: Thomas L Hoskins  
 Ass't Supt: D Barnard  
 Assay W Statler  
 (See Colo, N Y)

SIERA ANCHA MNG CO  
 Globe  
 URANIUM CLAIMS, Gila Cty.  
 Idle  
 (See Colo)

SIERRITA MNG & RANCHING CO  
 Box 25, Ruby Star Rd, Tucson  
 Treas: Leander M Harris  
 GOLDEN FLEECE MINE, Pima  
 Cty, Au  
 Idle  
 COWBOY MINE, Pima Cty, Pb, Ag,  
 Zn  
 Mine  
 OLD POWERS MINE, Pima Cty, Cu

SILVER FLAKE MINE  
 305 S Marana St, Prescott  
 Own: W R Fitzgerald  
 MINE: 5 mi S of Prescott, undergr.,  
 Zn, Pb, Ag, Cu, Co  
 Geol: W M O'Dell  
 Idle  
 MOLLY MINE, Mo, Ag, B, Ni, Cu  
 Gen Mgr: W M O'Dell  
 Under devel

SILVER REEF MINE  
 Box 492, Casa Grande  
 MINE, 12 mi S of Casa Grande,  
 undergr, open pit, Ag  
 Idle

SISKIYOU CORP  
 Box 889, Reno, Nev  
 AMERICAN EAGLE & OLD  
 RELIABLE MINES, Cu  
 Mine Frm: M R Biswell, Box 889,  
 Mammoth  
 GLOBE & PRINCE MINES, Cu  
 Mine Frm: M R Biswell  
 (Leased from Phelps Dodge Corp)  
 (See Calif, Nev)

SITTON & CO  
 1113 W McDowell Rd, Phoenix  
 KANAB #4 & LONG WOLF MINES,  
 Maricopa Cty, Ma

SKILES OIL CORP  
 Skiles Bldg, Mt Carmel, Ill  
 U<sub>3</sub>O<sub>8</sub> Prod

SMITH, H C  
 Globe  
 LITTLE JOE MINE, U<sub>3</sub>O<sub>8</sub>

SMITH, GEORGE W SR  
 Cortez, Colorado  
 Mn Prod

SNYDER M & M CO  
 Box 41, Sonora  
 Mgr & Own: Phil Snyder  
 CONGLOMERATE MINE, Pima Cty.,  
 Cu  
 Idle

SOREN ASBESTOS CORP  
 Box 1431, Globe  
 Pres: Wm W Sorenson  
 VP: Vance Thornburg  
 Sec: Loraine Sorenson  
 SALT RIVER GROUP, Gila Cty.,  
 undergr, asbestos  
 Idle

SOUTHERN CROSS MNG CORP  
 Box 47, Quartzsite  
 Mgr: L A Appling  
 LUCKY LEAD #1-6, 10 mi S of House,  
 undergr, Pb, Zn, Ag, Au  
 Idle

SOUTHWEST MINES CONTR CO

Box 1041, Prescott  
 Gen Mgr: Joe Ward  
 GREAT SCOT MINE, 19 mi SE of  
 Prescott, undergr, Pb, Zn, Au, Ag  
 WHITE PEARL, 7 mi S of Prescott,  
 undergr, WO<sub>3</sub>  
 Idle

SOUTHWEST MNG INDUSTRIES  
 415 E 3rd St, Tucson  
 Pres: Herb C Brauchla  
 Gen Mgr & Geol: J Clyde Davis  
 NORTH STAR MINE, undergr & open  
 pit, Cu, Au, Ag  
 Under devel

SPAR MNG CO  
 Box 96, Ft Thomas  
 Pres: Wm C Rhodes  
 Supt: C H Rhodes  
 SPAR MINE, undergr & open pit,  
 CaF<sub>2</sub>,  
 Idle

SPARKES, GRACE M  
 Star Rt, Hereford  
 Mgr: Perry L Jones  
 STATE OF TEXAS MINE, Star Rt,  
 Hereford, 28 mi W of Nogales, under-  
 gr, Zn, Pb, Ag, Au  
 Idle

SPARTAN MNG CO  
 544 Beale St, Kingman  
 DEMOCRAT MINE, undergr, U<sub>3</sub>O<sub>8</sub>  
 Gen Mgr: Charles E Howell  
 Ass't Gen Mgr: Ralph E Antoff  
 Gen Supt: Dick Hart  
 Geol: Lorenzo Demars

SPEARS, CARL N  
 P O Box 1287, Yuma  
 U<sub>3</sub>O<sub>8</sub> Prod

SPENCER URANIUM MNG  
 Atlas Bldg, Salt Lake City, Utah  
 U<sub>3</sub>O<sub>8</sub> Prod

STANLEY BUTTE MNG CO  
 Box 11, Safford  
 Pres: R W Annis  
 VP: C H Heirs  
 Sec: E E Miller  
 Treas: C G Watson, Safford  
 PRINCESS PAT MINE, Safford,  
 undergr & open pit, Cu, Ag, Zn, Au  
 Gen Mgr: Reed R Crunk  
 Ass't Gen Mgr: Lyman W Crunk  
 Gen Supt: Vernon D Crunk  
 Geol: A E Gibhardt  
 Mech Eng: E Purvis  
 Met: Ed Smith  
 Elec Eng: H L Annis  
 Under devel

STEINBERGER DRILLING CO  
 Cameron  
 Pres: H Steinberger  
 ALYCE TOLINO, JULIA SEMOLLIE  
 & JUAN HORSE MINES, Cameron,  
 open pit, U<sub>3</sub>O<sub>8</sub>  
 Under devel

STETTER, J J  
 Box 27, Quartzsite  
 TUNGHILL, WO<sub>3</sub>  
 Idle

STOVAL MANGANESE MNG CO  
 560 W Van Buren St, Box 653,  
 Phoenix  
 LS&A MINE, Superior, Pinal Cty.,  
 undergr, Mn  
 Mine Supt: O K Miles

STURDIVANT & FISHER  
 Florence  
 ZIG ZAG MINE, Pinal Cty., Mo.  
 Mgr: E J Sturdivant

**Arizona**

**SUMMIT COPPER MINES, INC**  
Box 194, Payson  
Pres & Gen Mgr: R W Thompson  
VP: Dr A L Gagnier  
Sec: Nina M Thompson  
**SUMMIT MINE**, 6 mi NW of Payson,  
undergr., Cu, Au  
**50-TON GRAY MILL**  
idle

**SUN - GOLD MNG CO**  
11 Valley Nat'l Bldg, Tucson  
Pres & Mine Supt: Alfred E Turner  
Sec-Treas & Gen Mgr: John C Gung' I  
**SUN-GOLD GROUP**, Pima Cty.,  
undergr., Au, Ag, Pb, Cu  
idle

**SUNRISE MNG CO**  
Box 52, Amado  
Pres: V P Simons  
Res Mgr: G W Irvin  
**GLOVE MINE**, 8 mi E of Amado in  
Santa Rita Mts, undergr., Pb, Ag, Zn,  
WO<sub>3</sub>  
Prod: 50 tons  
(See Texas)

**SUNSET MNG CO**  
213 Minna St, San Francisco, Calif  
Pres: J L Balocchi  
VP: W O Kay  
Sec: Charles Greenberg  
**MINE**, Pinal Cty, Au, Ag, Cu  
idle

**SUNSHINE MNG CO**  
378 Peyton Bldg, Spokane, Wash  
Res Mgr: Earl Elliston, Swissheim  
Lodge, Ellrda  
**HIGHLAND MINE**, Chochise Cty, Cu  
(See Idaho, Utah, Wash)

**SUPERIOR INDUSTRIES, INC**  
309-11 Middletons Bldg, Dallas, Tex  
Pres & Purch Agt: O T Ball  
VP: W C Maxey  
Sec-Treas: Inez Gibson  
**MARY T & SANDY NO 2 MINES**,  
Superior, open pit, perlite  
Gen Mgr: O T Ball  
Asst: Marion Mogrett  
idle

**TEJON MINE LSG & DEV CO**  
Box 603, Tombstone  
Own: William Ward  
**TEJON MINE**, 18 mi NE of Tomb-  
stone, undergr., Cu, Pb, Au, Ag  
Under devel

**TEJON TOM SCOTT MINE**  
c/o Ignacio Valer, Gleeson  
Mine, Cochise Cty, undergr., Cu  
idle

**THOMAS, B J & R ORINA**  
4802 E Scarlett St, Tucson  
UgO<sub>3</sub> Prod

**THREE C RANCH MINE**  
3C Ranch, Oracle  
Own & Oper: Mary West  
**MINE**, Pinal Cty, Au, Ag  
Mills, at mine  
Supt: Owen Wade

**THREE R MINE**  
Patagonia  
**MINE**, Santa Cruz Cty, Ag, Cu, Pb  
idle

**TIP TOP MNG CO**  
Box 27, Sahuarita  
**FORBES MINE**, Pima Cty, Cu

**TITAN URANIUM CO**  
c/o A J Giannini, Albuquerque,  
N Mex  
R F & R MINE, Apache Cty, surface,  
undergr., UgO<sub>3</sub>, V

**TOUT, EDWIN I**  
Tucson  
**TOUT MINES, INC**, Cochise Cty,  
surface, undergr., Cu  
idle

**TRETTLE, L V**  
c/o Gen Delivery, Cameron  
UgO<sub>3</sub> Prod

**TRUE BLUE MNG CO**  
Salome  
**TRUE BLUE MINE**, Yuma Cty,  
surface, undergr., Au, Ag  
Mgr: H L Cast  
idle

**TULSA MINERALS CORP**  
Box 1962, Globe  
Pres & Gen Mgr: J S Burden  
VP: P T Thibodex

Sec & Treas: W G Eastman  
Purch Agt: John W Cleary  
**LUCKY BOY & SUCKERITE MINES**,  
Gila Cty, undergr., U<sub>3</sub>O<sub>8</sub>  
1st Gen Mgr & Geol: H F Beasley  
Gen Supt: Everett Castle  
Lucky Boy Frm, K M Craig  
Suckerite Frm, John L Carter  
idle

**BUTTAIL MINE**, 14 mi S of  
Globe, undergr., Cu, Ag, Au, Pb,  
Zn, Wo<sub>3</sub>  
Mine Supt: Everett L Castle  
Geol & Ass't Gen Mgr: H F Beasley  
Under devel  
(See Okla)

**TURKEY CREEK PLACER**  
Cleator  
OP: Thomas R Cleator,  
MINE, Yavapai Cty, Au  
idle

**TWIN STAR INDUSTRIES, INC**  
1820 E Hampton St, Tucson  
Mgr: C Neil Vogel  
**WHITE CLIFF MINE**, open pit,  
diatomaceous earth  
Under devel

**TWIN STATES URAN CORP**  
PO Box 1471, Winslow  
UgO<sub>3</sub> Prod

**UNION GYPSUM CO**  
Winselman  
**UNION GYPSUM MINE**, Pinal Cty,  
surface, gypsum  
Mgr: Archie Lee

**UNITED MINERALS CORP**  
518 Peet Bldg, Salt Lake City, Utah  
Pres: George W Snyder, Jr  
VP: G W Snyder, Bluff & Covey  
Sec: Guy Snyder  
**RIP VAN WINKLE & LUCKY STRIKE**  
MINES, undergr.  
idle  
(See Nev)

**UNITED STATES SMELTING**  
**REFINING & MNG CO**  
75 Federal St, Boston, Mass  
Pres: F S Mullock  
**GOLD MINE**, Mohave County  
idle  
(See Alaska, Mass, N Mex, Utah)

**URANIUM & OIL DEVEL**  
**PROJECT, INC**  
341 N 14th St, Phoenix  
Pres & Gen Mgr: Guy J Stumpff  
VP: Ernest Feighner  
Sec-Treas & Geol: P H Lund  
**LUCKY HORSESHOE MINE**, Gila  
Cty, open pit, UgO<sub>3</sub>, rare earths  
idle

**U S GUANO CORP**  
Box 386, Kingman  
Pres & Treas: Charles F Parker, Jr  
VP: Thomas J McGovern  
Sec: R M Nickels  
Office Mgr: M F Crompton  
**BAT CAVES**, Grand Canyon, Gila  
Gen Mgr: Varley Crompton  
Gen Supt: B A Freiday  
Prod: 20 tons

**U S LIME PRODUCTS CORP,**  
**GRAND CANYON LIME &**  
**CEMENT CO DIV**  
2244 Beverly Blvd, Los Angeles,  
Calif  
**NELSON PLANT**, open quarry,  
vert kilns  
Supt: Roy Lauer  
(See Calif, Nev)

**U S TUNGSTEN CORP**  
Box 500, Congress  
Pres: J P Zannaras  
VP: Charles P Lower  
Sec: Peter Robinson, Jr  
**ZANNARAPOLIS MINE**, 35 mi NW  
of Congress, undergr., surface,  
sciesslike  
idle  
Mine Frm: L M Rutledge  
250-TON GRAY - FLOT MILL.  
Mill Frm: Jess Parrish

**UNIVERSAL COPPER CORP**  
2603 E Third St, Tucson  
Pres: James E Taylor  
**ALICE MINE**, undergr., Cu, Pb, Au  
Under devel

**URAINBOW, INC**  
906 Kearns Bldg, Salt Lake City,  
Utah  
Pres: Henry B Squires  
VP: Robert W Shields

Sec-Treas: Val S Scoville  
**HACK'S CANYON MINE**, Fredonia,  
undergr., U<sub>3</sub>O<sub>8</sub>, Cu  
Under gr production  
Mine Supt: Lou Scoville  
idle

**URANIUM EXPL & COPPER**  
CO  
3411 W 14th Place, Phoenix  
Sec: P H Lund  
UgO<sub>3</sub> Prod

**URANIUM PETROLEUM CO**  
53 East 4th South, Salt Lake City,  
Utah  
UgO<sub>3</sub> Prod

**URANIUM RESERVE CORP**  
c/o Win Mower, Bluff, Colo  
**CAIRO SELLS TRACT**, Apache Cty,  
surface, undergr., U<sub>3</sub>O<sub>8</sub>, V

**UTAH SOUTHERN OIL CO**  
901 Utah Oh Bldg, Salt Lake City, I,  
Utah  
UgO<sub>3</sub> Prod

**UTC O URANIUM CORP**  
310 1st Nat'l Bank Bldg, Denver,  
Colo

Pres: Geo S Casey  
VP: Fred C Clymer  
Sec: H Clark Thompson  
Treas: John Auf  
Ass't Treas: J D Vander Ploeg  
**HUSKON #4-18 MINES**, Cameron,  
open pit, U<sub>3</sub>O<sub>8</sub>  
Gen Mgr & Geol: Mason W Rankin  
Frm: Charles Huskon  
Prod: 200 tons  
(See N Mex, Utah)

**VANADIUM CORP OF AMER**  
Durango, Colo  
**MONUMENT #2 MINE**, Monument  
Valley, open pit, U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Mine Frm: Fred Peterson  
(See Colo, N Mex, N Y, Utah)

**VASSER, C F & BILL**  
Box 522, Salome  
JACK POT #1, Wo<sub>3</sub>  
idle

**VENTURES, LTD**  
Patagonia  
**VULCANO & PINA GROUP**, Santa  
Cruz Cty, Ca  
idle

**VERDE VALLEY INDUSTRIES,**  
**'INC**  
c/o Riney B Salmon, Phoenix  
Title & Trust Bldg, Phoenix  
Sec-Treas: Riney B Salmon

**UNITED VERDE MINE**, Yavapai  
Cty, Cu  
idle

**VERMILION CLIFFS MNG**  
**CORP**  
Box 1937, Flagstaff  
Pres: C E Knowles  
VP: R E Darling  
Sec-Treas & VP of Oper: Allen C  
Tester  
Mines, Cameron, Ariz area, Navajo  
Indian Reservation, open pit, U<sub>3</sub>O<sub>8</sub>  
idle  
(See N Mex)

**VERNON, LEWIS & DAVIS**  
Williams  
**V L & D MINE**, Cochise Cty, surface,  
undergr., Au  
Mgr: Ben Lewis  
idle

**VIA DEVELOPMENT CORP**  
Box 4364, Santa Fe, N Mex  
Pres: C W Vin  
Sec-Treas: Hilliard Crown  
**MANGANESE MINE** (leased to  
Charles H Jones, Phoenix)  
**ASBESTOS MINE** (leased to Reynolds  
Falls Asbestos, Inc, Phoenix)

**WALAPAI HUALAPAI**  
Yucca  
**BONNY RUTH MINE**, Mohave Cty,  
surface, undergr., Wo<sub>3</sub>  
Mgr: Frank McCarty  
idle

**WARREN, EDWIN D**  
Pacific Palisades, Calif.  
UgO<sub>3</sub> Prod

**WEST COAST MINERALS**  
Flagstaff  
**WHITE MESA MINE**, Cu  
idle

**WESTERN GOLD & URANIUM,**  
**INC**

Box 198, St George, Utah  
Pres: Ralph G Brown

VP & Treas: David P Shirra

Sec: Berene Bacus

Mng Dir: Charles E Prior

**ORPHAN LODE MINE**, Box 95,

Grand Canyon, undergr., U<sub>3</sub>O<sub>8</sub>

Gen Supt: Richard V Wyman

Chf Geol: Max E Kofford

Mng: Jack K Howell

Mine Supt: Patrick E Sayre

Mine Frm: Ted Snyder

Prod: 30 tons

**BROWN-HENDERSON**, Humboldt,

Zn, Cu  
idle

**CROWDED KING MINE**, Crown King,

Au,  
idle

**PARASHANT MINES**, Mohave Cty,  
Cu, U<sub>3</sub>O<sub>8</sub>  
Geol: Robert P Hartmann

Under devel

(See Colo, Utah)

**WESTERN MNG & EXPLORA-**

**TION CO**

940 Ash Ave, Tempe

**BLACK BRUSH MINE**, U<sub>3</sub>O<sub>8</sub>

Mgr: C A Taylor

idle

**WESTMINSTER CORP**

416-20 1st Nat'l Bank Bldg,

Denver, Colo

Pres: David W Adams

VP: Melvin C Bowles

VP & Treas: R E Llewellyn

Sec: Mim T Holman

**PINE MTK & MERCURIO MERCURY**

MINES, Maricopa Cty, Hg

(See Colo, Nev, Utah, Wyo)

**WILKERSON, J L & CO**

Crown King

Mgr: Ed W Carls

**SAVOY MINE** in Yavapai Cty, Pb, Ag

Under devel

**WILKINS MINE GROUP**

Box M, Patagonia

Own: Rond Mng Trust

Leasee: Juniper Mining Co

MINES, Santa Cruz Cty, undergr.,

Pb, Zn, Cu

Gen Mgr: John Campbell

**C D WILSON MNG**

Box 102, Sahuarita

Op: C D Wilson

MINE, Pima Cty, open pit, Cu, Ag,  
Au

Prod: 250 tons

**WORLD MANGANESE CORP**

Box 37, Wenden

**BLACK JIM MC GREGOR**,

MC GREGOR & SLEEDLE EVE

MINES, Mohave Cty, Ma

idle

**YELLOW JEEP MNG CO**

2494 Glen Canyon Rd,

Altadena, Calif

UgO<sub>3</sub> Prod

**YELLOW OXIDE MINE, A**

**PARTNERSHIP**

c/o Mgr E S Thelan, Globe

MINE, Gila Cty, surface, Mn

**YUCCA MNG & MLG CO**

Box 67, Yucca

Pres & Gen Mgr: R J Dalton

VP: Fred Wolf

Sec: Ben F Williams

**ANTLER MINE**, 11 mi E of Yucca,

undergr., Cu, Zn, Ag, Au

Prod: 150 tons

**150-TON PLOT MILL**

idle

**ZODIAC URANIUM, INC**

330 Ness Bldg, Salt Lake City,

Utah

Pres: Leo G Bateman

VP: M G White

Sec: Paul Jones

Treas: Gladys B Hervey

**NAVAJO INDIAN RESERVATION**

MINE, surface, U<sub>3</sub>O<sub>8</sub>

Geol: Leeland J Davis

Under devel

(See Moqui)

**ARKANSAS****ALUMINUM CO OF AMERICA,  
MNG DIV**

150 Alcoa Bldg, Pittsburgh 13, Pa  
Pres: F L Magee  
VP/Mgr Mng Div: Lawrence Litchfield, Jr

Treas: E B Wilber  
Sec: A M Hunt

Gen Purch Agt: R O Keffer

MINES, Bauxite, bauxite

Gen Mgr: J T Watters

Asst Gen Mgr: H W Rucker

Geol: G C McBride

Mine Supt: J E Cole

Mine Eng: R L Schell

Prod: 3,000 tons

(See Ill, Pa)

**AMER CYANAMID CO**

Box 726, Little Rock  
MINE, 4 mi S of Little Rock, surface, bauxite

Mine Mgr: R H Harris

(See Fla, Ga, NY, Va)

**APEX MNG CO**

Cushman  
MINES, Cushman, open pit, Mn

**ARKANSAS GYPSUM CO**

Murfreesboro  
Pres & Gen Mgr: Vernon B Lewis  
GYPSUM MINE, Murfreesboro, undergr., surface

**ARKANSAS MNG & EXPLOR CO**

Batesville  
MINES, N of Batesville, open pit, Mn

**BAXTER, LEONARD**

Cushman  
MINES, Cushman, open pit, Mn

**DICKINSON - McGEORGE, INC.**

Box 248, Pine Bluff  
MINE, bauxite

**DULIN BAUXITE CO**

Sweet Home  
MINE, bauxite

**HARGUS MNG CO**

Hanna  
Pres: Will H Hargus  
VP: Will H Hargus, Jr  
MINE, Polk Co, open pit, Mn  
Prod: 18 tons  
Under devel

Geol: William Campbell

Assayer: Bruce Williams

**MAGNET COVE BARIUM CORP**

Box 6504, Houston 5, Texas  
MINE, Magnet Cove, undergr., barite  
Gen Mgr: James S Stark  
Mine Supt: Marvin Verrier  
Cof Mgr: Fred Schart  
Met: B C Holdings  
Geol: Harry Metcalf  
Prod: 1,200 tons

1,200-TON FLOT-MILL, Malvern

Supt: E H Spraggins

(See Fla, Mo, Nev, Tex, Wyo)

**MILLER & MC GEE**

Batesville  
MINES, N of Batesville, open pit & undergr., Mn

**NATL LEAD CO, BAROID DIV, MAGNET COVE OPER**

Malvern  
MINE, 12 mi N of Malvern, surface, Ba  
Supt: E C Farrell  
Asst Supt: W A Halbert  
100-TON FLOT MILL  
(See Calif, Kans, La, Mont, Mo, Nev, NY, Tenn, Tex & Wyo)

**POROCEL CORP**

Menlo Park, NJ  
Pres: W W Gary  
VP: A G Blake  
Sec: M C Flint  
Treas: C W Nielsen  
Prod Dir: T L Falknor  
MINE, Berger, open pit, bauxite  
Mgr: M N Rowland

**REYNOLDS MNG CORP**

Boyle Bldg, Little Rock  
Pres: Walter L Rice  
VP: R H Zieglin  
Sec: Allyn Dillard

Treas: C E Coghill  
Purch Agt: M W Henry  
REYNOLDS MINE, Box 380, Bauxite, undergr., open pit, bauxite  
Gen Mgr: R H Zieglin  
Supt, open pit: H T Middlebrook  
Supt, undergr: G M Wagner  
Elec Eng: J T Harper  
Local Purch Agt: J W Glover  
Asst Mine Supt: J A Fuller  
Mine Eng: R J Krause  
Prod: 2,000 tons  
(See Colo, Va)

**UTLEY, HARVEY**  
Box 431, Batesville  
MINES, N of Batesville, open pit, Mn  
10-TON MILL, Ind City  
Assayer: Bruce Williams

**CALIFORNIA****AJAX TUNGSTEN CORP**

137 S Main St, Bishop  
Pres & Gen Mgr: C H Hall  
VP: George Temple, Gayle Green  
Sec: Bruce R Thompson  
Treas: J E Snelson  
TUNGSTAR, HANGING VALLEY  
FERMANDO-DURHAM MINES, undergr., WO  
Gen Supt: J E Escola  
Mine Supt: Geo L Hall  
Prod: 100 tons  
100-TON GRAV MILL, Bishop  
Mine Supt: Day Johnson  
Idia

**ALHAMBRA CONSOL MINES INC**

1903 Outpost Dr, Hollywood  
Pres & Gen Mgr: O H Griggs  
VP: Walter W Smith  
Sec & Asst Gen Mgr: Joseph Rego  
Treas: Frank C Waller  
ALHAMBRA MINE, Box 727, Placerville, undergr., Au  
Mine Supt: Chris Matkevich  
Mill, at mine, Prod: 40 tons  
Idia  
(See Nev, Utah)

**ALLEN, E E**  
145 Persia St, San Francisco  
FIDELITY MINE, Glencoe Dist, Au

**ALLIANCE TALC MINE**

Darwin  
Op: George W Koest  
MINE, 17 mi E of Keeler, steatite  
Idia

**ALMADEAN DUMPS**

Almaden  
MINE, Santa Clara County, Hg

**ALTA COPPER CO, INC**  
Box 308, Gasquet  
Pres & Gen Mgr: Joe Heinrich  
Sec: Ralph Yoder  
Geol: Roger Beale  
ALTA COPPER MINE, 8 mi E of Smith Riv, Del Norte Co, undergr., Cu

**AMERICAN ASBESTOS MNG CORP**  
11 W 43rd St, New York  
MINE, Calaveras Co, asbestos  
Idia

**VOORHIES MINE**, Copperopolis, asbestos

**AMERICAN CHROME CO**  
1 Montgomery St, San Francisco  
Pres: Willis A Soren  
VP & Gen Mgr: John Bley  
Sec: Gen M Spradling  
Treas: John L Lusk  
Purch Agt: D W Graves  
MOUAT MINE, Nye, Montana  
(See Montana)

**AMERICAN INTERNATL MNG & MLG CO, INC**  
1533 Riverside Dr, Los Angeles  
Pres & Gen Mgr: Clemons M Roark  
VP-Sec: Gene Loose  
Treas: J Roy Owens  
ITALIAN-FREMONT-GOVER MINE, Drytown, undergr., Au, Ag  
Gen Supt: Harry Palmer  
Geol: T M Daniels  
Under devel  
100-TON MILL, Drytown

**AMERICAN MINERAL CO**

840 S Mission Rd, Los Angeles 23  
Pres: A H Stahmer  
VP & Gen Mgr: W A Merle  
WHITE ROCK MINE, 12 mi NW of Cantil, surf, ceramic clay  
Prod: 400 tons per mo  
Mine Supt: Paul Edgemar  
100-TON MILL, Los Angeles, commercial grinding  
CLAY PIT, Kern County

**AMERICAN POTASH & CHEM CORP**

3030 W 8th St, Los Angeles 54  
Pres: Peter Colefax  
VP, Sales: Wm J Francis  
Sec: Richard J Heffler  
Treas: Lawrence A Adams  
Purch Agt: Lawrence H Cornelius  
SEARLES LAKE MINE, Lake Brines, Trona, potash, borax, soda salts, Br, Li  
Gen Mgr: M L Leonard  
MILL & SMELTER, Trona

**AMERICAN SMELTING & REFINING CO**

405 Montgomery St, San Francisco  
MINING DEPT  
Res Geol: L K Wilson  
BLAST FURNACE, Selby, lead  
Mgr: W S Reid  
Asst Mgr: G H Player  
Gen Supt: B K Shedd  
Purch Agt: J M Hanna  
Smelter Supt: F C Morris  
Refin Supt: Al Lohbe, Jr  
Mast Mech: J L White  
(See Aris, Colo, Idaho, Ill, Kans, Md, Mont, Nev, N J, N Mex, NY, Tex, Utah, Wash, and Federal Mng & Smelt  
ing Co, Mo)

**ANACONDA COMPANY, THE**

25 Broadway, New York 4, NY  
Pres: Clyde E Wood  
Exec VP: Edward S McGlone  
VP, Western Oper: C H Steele, Butte, Mont  
Sec-Treas: C Earle Moran  
DARWIN MINE, Darwin, undergr., Pb, Zn, Ag  
Idia  
FLOT MILL, Darwin  
Idia  
SHOSHONE MINE, Tecopa, undergr., Pb, Ag  
Idia  
125-TON FLOT MILL, at Shoshone  
mine  
Idia  
(See Idaho, Mont, Nev, N Mex, NY, Utah)

**ANDREWS MNG CO**

Box 492, Headingsburg  
Pres: Lowell Andrews  
VP: Mel Woods  
Sec: Merle Heffley  
CRYSTAL MINE, 19 mi NE of Headingsburg, undergr., chalcocite  
Own: P G Cox  
(Leased to Andrews Mng Co)  
Under devel

**ARGENTINA CONS MNG CO**

1235 Carlton Dr, Glendale  
Pres: Harry Lee Martin  
VP & Sec: Edwin C Horrell  
MINE, Ap, Pb, Zn, V<sub>2</sub>O<sub>5</sub>  
Idia  
(See Nevada)

**AROO, ROY, BOETHING, E B & GRIFFITHS, LAWRENCE CO-OWNERS**

c/o Roy Arg, 11837 S Loma Dr, Whittier  
LILLY II, 2, 3, 4 MINES, State Range dist, undergr., Au, Ag, Pb, Cu, Mn, U<sub>3</sub>O<sub>8</sub>, Ba, magnetite, Zr  
Supt: Roy Arg  
Assay: Smith Emery  
Idia

**ASHLAND MNG CO**

433 "J" St, Crescent City  
MINES, Del Norte Co, Cr  
PAIRVIEW MINE, Hamburg, undergr., Cr

**ASH, WM L**

86 Davis St, Quincy  
MT HOUGH & PIONEER MANGANESE MINES, Imperial Co, Ca

**BACKLINS, ANDREW & PAUL**  
80 Pierce St, San Francisco 17  
EMPIRE-LONE STAR GROUP, 12 mi NE of Donaville, undergr., Au  
MEXICAN MINE, 2 mi E of Goodyear's Bar, Au  
Under devel  
(Leased to Hampton Mining Co)

**BAIRUM PROD, LTD**

(Subsidiary of FOOD MACH & CHEM CORP)  
SAVERCOOL MINE, Plumas City, barite  
Idle  
Idia  
ALMANOR MINE, Greenville  
Idle  
(See Barium Products, Nevada; Intermountain Chem, Wyo)

**BEAM SMELTERS & IMPERIAL MINES, INC**  
10535 Buford Ave, Ingleside 3  
Own: L Miller Beam  
IMPERIAL DIGGINS, LUCKY JACK, PIONEER, SARA ALICIA, GOLDEN EAGLE, GOLD FIELDS, undergr., open pit, Au, Co, WO<sub>3</sub>, Cu, Mn  
Prod: 5,000 tons

**BECK, MARTIN**  
Box 343, Mojave  
GUNTREE MINE, Kern Co, WO<sub>3</sub>, Idia

**BEDELL, STUART**  
Big Pine  
WAUCALIA MINE, Mono Co, WO<sub>3</sub>, Idia

**BELDEN AMADOR MINES, INC**  
Box 30, Pine Grove  
Pres: Donald Griffin  
VP & Gen Mgr: Leon M Banks  
Sec: Don A Weber  
BELDEN MINE, Pine Grove, 20 mi E of Jackson, An, Ag  
Idia  
40-TON GRAV FLOT MILL

**BENOIST, M L**  
Box 253, Weaverville  
CHLORIDE & GLOBE MINES, 23 mi from Weaverville, undergr., surface  
Idia  
30-TON MILL

**BEST MINES CO**  
Box 177, Downsville  
Pres: I L Best  
VP: B C Austin  
Gen Mgr: L L Huelsdonk  
GOLD BLUFF, BRUSH CREEK & OXFORD MINES, undergr., Au  
Mine Supt: W T Reed, Jr  
Eng: B C Austin  
Master Mech: A R Hinton  
FLOT MILL  
Supt: John Folsom  
Frnr: Vernon Huffman

**BIG CHIEF MERCURY MINES**  
Box 235, Middletown  
Own: W L MacKinnon  
**BIG CHIEF MERCURY MINES**, undergr & open pit, Hg  
Asst Mine Supt: Eddie Austin  
Under devel

**BIG FOUR MNG & MLG CO**  
P O Box 218, Lomita  
Pres: Lester G Michaelis  
VP: Slim M Bramlette  
Treas: Harold Brett  
Purch Agt: Roy Johnson  
MINES, Cima, Paris Lorraine, Kramer, open pit, placer, Th, U<sub>3</sub>O<sub>8</sub>, Ba, magnetite, Zr  
Mine Supt: Roy Johnson  
Asst Mine Supt: Slim Bramlette  
Under devel  
(See Nev)

**BIG SEVEN MNG CO, INC**  
223 S "C" St, Lompoc  
Pres & Gen Mgr: D E Neuschwander  
VP & Geol: R G Hendy  
Sec-Treas: C M Benedict  
Purch Agt: Roy Johnson  
MINES, Cima, Paris Lorraine, Kramer, open pit, placer, Th, U<sub>3</sub>O<sub>8</sub>, Ba, magnetite, Zr  
Mine Supt: Roy Johnson  
Asst Mine Supt: Slim Bramlette  
Under devel  
(See Nev)

**BLACK SCORPION MNG CO**  
Hardin Flat, Groveland  
Part: H L Guine & P Sutrich  
BLACK SCORPION MINE, 24 mi E of Groveland on Hwy 120, undergr., Ag, Au  
Under devel

**BLACK GIRL MINES CO**  
P O Box 1, Death Valley & Box "M", Ouray, Colo  
VP & Gen Mgr: J M McDadden  
Sec: Doris E McDadden  
Geol: C M Shaw  
(See Colo)

**California**

**BLACKSTONE MINES, INC**

5300 Barrett Ave, Richmond  
Pres: Lawrence A Sanchez  
VP: Louis G Sanchez  
Sec: Univ Lipisto  
**BLACKSTONE MINE**, West Point,  
undergr, Au, Ag, Pb  
Gen Mgr: L A Sanchez  
Gen Supt: E H Syms  
50-TON PLOT MILL, at mine  
Supt: Levi Lipisto

**BLUE LIGHT SILVER MINES CO**

Chapman Ranch, Fullerton  
Pres: C Stanley Chapman  
Sec: Sam L Collins  
**SILVERADO MINE**, 20 mi E of  
Orange in Silverado Canyon, Pb, Zn,  
Ag  
50-TON CONC & PLOT MILL, at  
mine  
idle

**BLUE RIDGE MIDWAY GOLD MINES CO, LTD**

Callahan  
Pres: Gerald B Hartley  
Sec-Treas: S H Hartley  
**TIPTOP & HILTON CREEK MINES**,  
Mono City, WO  
**SUGAR HILL MINE**, Callahan, Au  
idle  
**BIG BLUE MINE**, Callahan, Cu  
idle  
**PILOT MINE**, Downieville, Au  
idle

**BLUEBIRD MINE**

P O Box 575, Winterhaven  
Own: Robert K Foster  
**MINE**, 3 mi NE of Ogilby  
surface, mica  
Gen Mgr: Robert K Foster  
Prod: 5 tons  
**SIDEWINDER GRAV MILL**, 1 mi W  
of Winterhaven, water-wash mica  
Prod: 5 tons mica

**BLYTHE MANGANESE CO, INC**

8845 W Olympic Blvd,  
Beverly Hills  
Pres: George F Kremer  
Sec: G Wolkhauer  
**ARLINGTON GROUP**, P O Box 325,  
Blythe, undergr, & open pit, Mn  
Prod: 250-350 tons  
300-TON GRAV MILL, Inca Siding  
Mill Supt: A F Garlik  
(See Calrado Devel Co)

**BON TON MINING Co**

Murphys  
**OWER LODGE MINE**, East Bell  
dist, Au, Ag  
idle

**BRADFORD, L M**

Bon 297, Madera  
**DAULTON MINE**, Daulton dist, Ag,  
Cu, Pb  
idle

**BRADLEY & ECKSTROM, INC**

34 California St, San Francisco  
Pres: E O Eckstrom  
VP & Gen Mgr: R F Heimke  
**MINES**, Ariz, Calif, Nev, Utah,  
Idaho, Ore, surface & undergr, Cr,  
Fe, Cu, Zn, WO<sub>3</sub>, rare earths,  
 asbestos  
150-TON GRAV MILL, Castella  
Supt: C Robinson  
(See Ariz, Idaho)

**BRADLEY MINING CO**

660 Market St, Rm 915, San  
Francisco 4  
Pres: Worthen Bradley  
Exec VP: John D Bradley  
VP: James P Bradley  
Sec-Treas: Q C Orion  
**REED MINE**, Lower Lake, Hg  
(Leased)  
**SULPHUR BANK MINE**, Clearlake  
Oaks, Hg  
**GREAT WESTERN MINE**, Middle-  
town, Hg  
idle  
(See Idaho, Nevada)

**BRIGGS, HARRY E**

Box 613, Trona  
**RED CLOUD MINE**, 10 mi E of  
Ballarat, Panamint Mts, undergr,  
Au, Ag, Pb  
idle  
**SOUTHERN HOMESTAKE MINE**,  
8 mi S of Ballarat, undergr, Au, Ag  
idle

**BRINK & NUHN**  
Box 3104, Stockton  
**YELLOW STAR MINE**, West Point  
Dist, Au

**BROCK, ROBERT**  
River Pt, Box 22, Madera  
**HESKELL PROP**, Madera City, Au  
idle

**BROWN, EUGENE B**  
O'Brien, Oregon  
**HIGH PLATEAU MINE**, Del Norte  
County, Cr

**BROWN, JOSEPH GABEL**  
Campionville  
**DEPOT HILL MINE**, Yuba County,  
placer, Au, hydraulic and wash plant  
idle

**BROWN BEAR MINES**  
Box 66, French Gulch  
Gen Mgr & Consal Eng: E E Brick  
**BROWN BEAR, TANGLE BLUE &**  
**REID MINES**, 12 mi W of French  
Gulch, Shasta County, undergr, Au  
idle  
70-TON GRAV-PLOT MILL at  
Brown Bear  
30-TON GRAV-PLOT MILL at  
Tangle Blue

**BROWN'S CREEK PLACER**  
Box 23, Weaverville  
**GOLD PLACER**, Trinity County  
idle

**BROWNSTONE MNG CO, INC**  
Box 396, Bishop  
Pres & Gen Mgr: W V Skinner  
Treas: G B Vogt  
**BROWNSTONE MINE**, Bishop, 20 mi  
W of Bishop, undergr, scheelite  
idle

**LAKE VIEW TACO FL**, 2, 10 mi SE  
Lake Pine, Si  
Prod: 300 ton  
(Leased from Giadding McBean Co)

**BUCHENAU, H J**  
Star Rd, 17, Madera  
**JESSIE BELL MINE**, 15 mi NE of  
Madera, undergr, Cu, Au, Ag  
Under devel

Prod: 10 tons  
Mine Supt: Bud Syms  
30-TON PLOT MILL, Garfield, Utah  
Mill Supt: Pete Rosetti

**BUCKMAN LABORATORIES, INC., MNG DIV**  
Geiser Road, Cloverdale  
Pres & Gen Mgr: Dr J Buckman  
VP: W D Stitt  
Sec-Treas: C H Turner  
Purch Agt: M Blakeslee

**BUCKMAN MINES**, undergr, open  
pit, Hg  
Gen Mgr: Roger N Miller  
Gen Supt: Harold D Field  
Purch Agt: A E Turpin  
80-TON MILL, at mine

**BUENA VISTA, MINE**  
Box 233, Templeton  
Own: Harold J Biagini  
**BUENA VISTA MINE**, Adelaide Rd,  
17 mi W of Paso Robles, open pit, Hg  
Mine Supt: Rudolph Rude  
Prod: 100 tons

30-TON MILL at mine  
Mill Supt: Errol Dodd  
Ass't Mill Supt: Dee Fitchugh

**BUENA VISTA NO 2 MINE**  
Box 23, Redding  
Own: H G Graves  
**MINE**, 3 mi W of Redding, Au, Cu,  
WO<sub>3</sub>, UO<sub>3</sub>  
20-TON PLOT MILL  
idle

**BUNKER HILL CO, THE**  
The Bunker Hill Bldg, 660 Market  
St, San Francisco 4  
Pres: John D Bradley  
VP: Emmett G Solomon, W G Woolf,  
D L Feathers, R H Cutting,  
H E Lee  
Sec: D L Feathers

Treas: Emmett G Solomon  
Purch Agt: Gil Mayes, Kellogg, Idaho  
(See Idaho, Wash)

**BUNKER HILL MNG CO**  
Box 1347, Redding

Mgr & Eng: A Manfield  
**BUNKER HILL MINE**, 3 mi NW of  
Redding, undergr & surface, Au, Ag  
Cu  
Mine Eng: Abraham Manfield  
idle  
SMELTER, 1-1/2 mi NW of Redding  
idle

**BURGEN & OLSON MNG CO**  
PO Box 83, 839 Washington St,  
Hollister  
**STAYTON & NORTH STAR CLAIMS**,  
Merced County, Hg

**BURNS & SMITH COMS MINES**  
Box 15, Tecopa  
Pres: Bob Burns  
VP: Hugh Smith  
Sec: R C Hall  
**BAGDAD CHASE MINE**, Ludlow,  
undergr, Au, Cu  
idle  
SMELTER,

**BURRO SHOE MNG CO, INC**  
203 Baylor St, Duarite  
Pres: Audley L Smith  
VP: Cash L Swinney  
Sec-Treas: Wm J Clark  
**BURRO SHOE MINE**, Saline Valley  
Dist, open pit, Cu, Mn, Au, Ag  
Under devel

**BURTON MINES, INC**  
Rosenmond  
Pres & Gen Mgr: G C Burton  
Purch Agt: George McNamee  
**TROPICO MINE**, 5 mi W of Rosenmond,  
undergr, Au, Ag  
Ass't Mgr: G A Settle  
idle

100-TON CYANIDE MILL, at mine  
Pmn: Alec Burton  
Assay: Frank Stemmene  
SMELTER, at mill  
Prod: 1,000 lbs yearly

**BUTLER MNG & DEVEL CO, INC**  
1544 Zinfandel Drive, Box 39,  
Rancho Cordova  
**SUGAR LOAF MINE**, El Dorado  
County, Au  
idle

**BUTTE LODGE MNG CO**  
Box 196, Randsburg  
Pres: Bert Wagman  
**BUTTE LODGE MINE**, Kern County,  
undergr, Au, Ag  
CUSTOM MILL

**BUTTE BAR MINES**  
Box 123, Plumas City  
Pres: Perry L Jones  
**BUTTE BAR MINE**, Plumas City,  
undergr, Au, Ag, U<sub>3</sub>O<sub>8</sub>, Te, Se  
Under devel  
35-TON GRAV MILL  
Under devel

**BUTTE MINES**  
3015 La Cresta Dr, Bakersfield  
Own & Op: J H Boston  
**BUTTE-MINE**, 12 mi E of Glendale, Hg  
undergr & surface, WO<sub>3</sub>  
Geol: Chas Shaw  
Mills, at Glendale

**C A M LEASING CO**  
Iowa Hill  
**Occidental MINE**, Placer County,  
Au  
idle

**C M S STRATEGIC METALS, INC**  
8000 SE Foster Rd, Portland 8  
CLAIMS, Del Norte Cty, Ma  
idle

**CACHUMA MNG CO**  
P O Box 96, Santa Ynez  
**CORRALES MINE**, Santa Barbara  
County, Cr,O<sub>3</sub>

**CALARI MNG CO**  
3539 Linden, Long Beach 7  
Pres & Gen Mgr: L P Albrecht  
Sec-Treas: C M Smith  
Gen Supt: V H LeMay  
(See Ariz)

**CALAVERAS CENTRAL GOLD MNG CO, LTD**  
Angels Camp  
Pres & Gen Mgr: Harry Soars  
Mgr: Desmond Sears  
MINE, undergr, placer, Au  
CRUSHING & SCRUBBING PLANT,  
Au, Highway aggregates  
Prod: 800-850 tons

**CALIFORNIA INDUSTRIAL MINERALS CO**  
Box 180, Frazier  
Own: Forrest S Taylor  
**TAYLOR MINE**, nr Frazier, volcanic  
ash  
150-TON DRY MILL

**CALIFORNIA LIMESTONE PRODUCTS**

Box 1064, Blythe  
Pres & Mgr: R S Hall  
VP: John Scovajian  
Sec-Treas: Maurice Wilkow, Jr  
**LANGDON MINE**, Box 1064, Blythe,  
12 mi NW of Blythe, undergr &  
surface, Mn  
Gen Mgr: R S Hall  
Gen Supt: James F Carr  
Prod: 300 tons of Mill grade ore

**CALIFORNIA PLACER MINE**

Sailor Flat  
Own: Marie & Morton S Martin,  
150 Arlington Ave, Berkley 1  
Gen Mgr: H T Martin  
Geol: Chas S Haley  
**CALIFORNIA PLACER**, 24 mi E of  
Forest Hill on Forest Hill divide,  
hydraulic, Au  
Mine Supt: M S Martin  
idle

**CALIF QUIICKSILVER MINES, INC**

215 Market St, San Francisco 5  
Pres: R F O'Bryan  
VP: R P Hasenauer  
Sec: H H Hill  
**ABBOTT MINE**, Box 548, Williams,  
undergr, Hg  
Gen Mgr: C O Reed  
Geol: Fred Hanson  
Pmn: A J White  
Prod: 50 tons  
60-TON GRAV MILL at mine, rotary  
kiln

**CALRAD CO**

Box 1064, Blythe  
Co-Part: R S Hall & Maurice  
Wilkow, Jr  
**BLACK JACK-ARLINGTON MANGANESE MINE**, 22 mi NW of  
Blythe, surface & undergr  
(Leased to Blythe Manganese Co)

**CAMPION, IVAN H**

Bromerset via Coles Station  
**IRISH SLIDE MINE**, 23 mi SE of  
Placerville, undergr, placer, Au,  
Ag  
idle

**CARRIDNO, INC**

1037 W 18th St, Santa Ana  
Pres: R H Carr  
VP: M W Carr  
Sec: Daley Rigdon  
**JUPITER MINE**, San Bernardino  
Cty, undergr, Pb  
Geol: Donald Carlson

**CARRILLO, JUAN B**

Bitterwater Rd, King City  
**SANTA MARGARITA MINE**, New  
India Dist, San Benito Cty, surface,  
Hg

**CASTELLA MNG & MLG CO**  
24 California St, San Francisco 8  
**LAMBERT MINE**, Beto Cty, Cr,O<sub>3</sub>

**CASTLE, E C**  
Box 194, Bishop  
**WHITE CAPS MINE**, Inyo Cty, WO<sub>3</sub>  
idle

**CASTRO MNG CO**

1819 San Luis Dr, San Luis Obispo  
Gen Part: D A Hall, Geo I Barnett  
**CASTRO CHROME MINE**, s.s.

**CASTRO MNG CO**  
1819 San Luis Dr, San Luis Obispo  
Gen Part: D A Hall, Geo I Barnett  
**CASTRO CHROME MINE**, s.s.  
Prod: 75 tons

**CONCEN, SAN LUIS OBISPO**

**CEM TUNGSTEN MNG CO**  
Box 405, Fresno  
Pres: Charles E Marsh II  
**SWAMP LAKE MINE**, Dickey Creek,  
undergr, scheelite  
Mgr & Geol: Neil B Steuer  
Sept: Lloyd Gilbert  
idle  
50-TON GRAV MILL, Grouse Lake

**CHALLENGE MNG CO**

721 Shasta St, Redwood City  
**CHALLENGE MINE**, San Mateo  
County, Hg

**CHAMBERLIN, CHARLES**

Box 24, Johannesburg  
**OK GROUP**, Kern County, undergr,  
Au  
idle

California.

**CHAPMAN & SONS**  
Junction City  
**CHAPMAN & FISHER PLACERS,**  
Trinity County, hydraulic, Au  
Supt: G P Chapman  
Idle

**CHLORIDE CLIFFS MINE**  
Beauty Bar  
**MINE,** Inyo County, undergr., Au, Pb  
Idle

**CHOWCHILLA DREDGE CO**  
Box 348, Whittier  
**CHOWCHILLA MINE,** Madera Co.,  
placer, dredge, Au  
Idle

**CITY BLUE GRAVEL MINE**  
Box 260, Redding  
Off: H G Hampton, R H Cochran,  
Donald Flaylinsen  
**MINE,** 1 mi W of Redding, undergr.  
Au  
**35-TON FLOT MILL**  
Idle

**CLARK, CHARLES A**  
P O Box 41, El Dorado  
**OPHIR LODE,** Mother Lode dist.,  
Au, Ag  
Idle

**CLARK BROS**  
Star Rd, Box 329, Polson  
**PINE KNOB MINE,** West Belt dist  
Au, Ag  
Idle

**COLLINS, T E & BLOSS,**  
**STEPHEN**  
Rt 1, Box 64, Central Pk, Ore  
**BLUE JAY MINE,** Siskiyou Co., Cr  
(See Oregon)

**COLUMBIA - SOUTHERN**  
**CHEM CORP** - (Subsidy of  
**PITTSBURGH PLATE GLASS**  
Co)  
Rt 1, Gateway Center, Pittsburgh 22,  
Pennsylvania  
**PLANT,** Bartholomew, Owens Lake dist.,  
borax  
Plant Supt: Carl P Budde  
Idle

**COLUMBUS MINE**  
Box 184, Bell Gardens  
Own: Grace D Ball & Henry W Wim-  
mer  
(See Wyoming)

**COMSTOCK QUICKSILVER**  
CO., LTD  
537 California St, San Francisco  
**CLOVERDALE MINE,** Sonoma Co.,  
Hg  
Idle

**CONSOL MANGANESE CORP**  
300 Montgomery St, San Francisco  
**MINE,** Sonoma County, Hg  
Idle

**CONTINI BROS**  
Box 183, Jackson  
Pres & Gen Mgr: Nick Contini  
VP & Ass't Gen Mgr: Bert Contini  
**CONTINI THREE HORSEMINES, DIL**  
MINES, 7 1/4 mi E of Jackson on  
Hwy 88, undergr., Au, Ag  
Idle

**STAMPMILL,** Irish Town  
Mill Supt: V Garberini  
Assay: Marc Hanna  
Idle

**E B COOK CO**  
1063 Howard St, San Francisco 3  
**PERMIT MINE,** Mariposa Co.,  
undergr., Au  
Idle  
**8-TON MILL**  
Supt: H H Odgers

**COPPER QUEEN MNG CO**  
c/o Miles & Egglest, President  
1331 "F" St, Sacramento  
**COPPER QUEEN GROUP LODE,**  
Swamp Flat dist., Cu, Au, Ag  
Idle

**CORDERO MINING CO**  
131 University Ave, Palo Alto  
WP: S H Williamson  
Gen Mgr: J Eldon Gilbert  
**COPPER LUNDY MINE,** Mono, 10 mi W  
of Mono Lake, Au  
Idle

**QUEEN SABRE MINE,** Hollister, 19 mi  
E of Hollister, undergr., Sb  
Idle  
Geo Supt: Herbert Mitchell  
(See Idaho, Nevada, Oregon)

**CORONADO COPPER & ZINC**  
CO  
523 W 8th St, Los Angeles 14  
Pres: Geo D Dub  
VP: H T Mudd  
(See Arizona)

**CRAIG, MRS C M**  
2487 Portola Way, Sacramento  
**PERKINS GRAVEL CO PLANT**  
American River dist., placer, Au, Ag  
**HAGGIN GRAVEL PITS &**  
**DEL PASO GRAVEL PITS,**  
Folsom dist

**CROTSBERG, S D**  
Kernville  
**BRUSH CREEK MINE,** Kern Co.,  
WO,  
Idle

**CRUMPTON, VICTOR**  
Happy Camp  
**MDIE,** Siskiyou County, Au, Ag  
Idle

**CRYSTAL BALL MNG CO**  
21660 Bertram Rd, San Jose  
**MINE,** Santa Clara Co., undergr. &  
open pit, Hg  
Gen Mgr: Woodrow Goodman  
Geo Supt: Frank U Thompson  
Geol: Jack Whitaker  
Mech Eng: Arthur Merrill  
Prod: 14 tons  
**MILL & REFINERY,** at mine  
Mill Supt: Wm Duarie  
Prod: 17,365 lbs Mercury annually

**CUMMING - ROBERTS**  
739 N Highland Ave,  
Los Angeles 36  
Gen Part: H Evan Roberts  
(See Month)

**CYCLONE GAP MINE**  
Box 475, Grants Pass, Ore  
Lessees: Wm S Ruth Robertson  
& Assoc  
**MINE,** k Siskiyou Co., 30 mi S of  
O'Brien, Ore, undergr., Cr  
Mine Supt: W S Robertson  
Asst Mine Supt: A E Ekstrand  
Prod: 10 tons daily  
Idle

**CYPRESS MINES CORP**  
1200 Pacific Mutual Bldg, Los  
Angeles 14  
Pres: H T Mudd  
VP: A R Thomas  
VP & Treas: H S Nyce  
Sec: L A Garrett  
Purch Agt: W F Stover  
Bee Ariz, Colo

**D & D MLG CO**  
1106 W Isabel St, Burbank  
**RED ROCK MINE,** Inyo County,  
WO,  
**DIYO GROUP,** Inyo County, Au

**DAKIN CO**  
381 Hillside Dr, Burlingame  
Pres: Fred Dakin  
VP: Wesley Kergan  
Sec: Henrietta Dakin  
**UNCLE SAM MINE,** 10 mi NW of  
Central City, Shasta Co., undergr.,  
Au, Cu, Zn, Ag  
Idle

**DAVIES, TOM**  
Caliente  
**JUAN DOSE MINE,** Kern County,  
undergr., Au, Ag  
**MINDIE ELLEN MINE,** Tulare Co  
P & D LODE, Agu Caliente dist.,  
Ag, Au  
Idle

**DAVIS MNG CO**  
Rt 1, Box 158, Santa Maria  
**DAVIS MILL,** Santa Barbara Co.,  
Cr,O<sub>2</sub>  
**DAVIS, CLIFTON F**  
Box 32, Greenwood  
**C B DAVIS PROP (MCGRUBB) LODE,**  
Mother Lode dist., Au, Ag  
Idle

**DAVIS, RICHARD D**  
144 Lib St, San Bernardino  
**COPPER CRYSTAL LODE,** State  
Range dist., Pb, Ag, Cu, Zn  
Idle

**DAVIS, ROBERT E**  
Rt 2, Box 3455, Sacramento  
**BRIGHTON SAND & GRAVEL PLANT,**  
Folsom dist., Au, Ag

**DAVIS, W G**  
1848 103rd Ave, Oakland  
**REDCAP GROUP,** Orleans dist.,  
placer, Au, Ag  
Idle

**DEATH VALLEY PANAMINT**  
MNG CO  
Box 134, Baker  
Pres: Ellis O Baker  
**TELEGRAPH MINE,** Inyo Co., Au  
Idle

**DELL OSSO GOLD MNG CO**  
Box 1455, Terminal Annex,  
Los Angeles 54  
**DELL OSSO LODE,** Talvad mng  
dist., Au, Ag, Ilme, garnet & silica  
Idle

**DEL MONTE PROPERTIES**  
CO, SAND DIV  
Box 150, Pacific Grove  
Pres: M F Morse  
Plant Mgr: H H Bean  
Sales Mgr: P C Valentine  
Metal: Henry Benach  
Gen Supt: C J Houseman  
Geol: Don Tibbles  
**MINE,** Del Monte Forest, Pebble  
Beach, surface, glass sand, quartz,  
feldspar, gr sand  
Prod: 800 tons  
**800-TON FLOT MILL**

**DELTA MNG CO**  
2728 H St, Merced  
Op: F S Herring  
**JESSE BELLE MINE,** Madera Co.,  
Cu

**DIATOMIC CHEM PRODUCTS**  
CO, INC  
1516 Industrial St, Los Angeles 21  
Pres: Charles L Seymour  
VP: Carmen Esposito  
Sec-Treas: John F Atwill  
**DIATOMIC MINE,** Hwy 1, Lompoc,  
open pit, diatomite  
Gen Supt: D R Stephens  
Prod: 30 tons processed calcined  
2,000-TON MILL, Lompoc

**DICKIE EXPLOR CO**  
Alleghany  
**ORIENTAL LODE MINE,** undergr.,  
Au, Ag  
Gen Mgr: Donald R Dickey  
Geol: W Fuller  
Mine Frm: Frank Knapp  
75-TON FLOT-GRAV MILL, at mine  
Assay: Abbott Hanks

**DILTZ ORO GRANDE MNG CO**  
414 21st St, Merced  
Op: J D Fulham  
Mine, Mariposa Co., Au  
Idle

**DOBBINS, D A & ASSOC**  
1106 W Isabel St, Burbank  
**BRONZE MINE,** San Bernardino  
Co, WO  
Idle

**DONAHUE, LYLE**  
Oasis via Big Pine  
**TARGET GROUP LODE & MILL,**  
Deep Springs dist., WO  
Idle

**DONNER, H L**  
Milton via Farmington  
**DONNER & LOST LOG MINES,**  
Calaveras Co., Au  
Idle

**DOSCHER, CHARLES,**  
VICOVICH, V &  
MILKOEVICH, STEVE  
Pine Grove  
**JUMBO LODE,** East Belt dist., Au,  
Ag  
Idle

**DOUBLE O TIMBER & MNG**  
CO  
200 Davis St, San Francisco 11  
VP: Hans Hamner  
Sec-Treas: Albert S Simrak  
**DOUBLE O MINE,** 50 mi NE of  
Auburn, placer, Au  
Idle

**DRY ORE CONCENTRATOR,**  
INC  
Box 742, Yreka

Pres: A Duyster  
VP: Carroll Birdwell  
VP & Gen Mgr: Austin C Putnam  
Sec-Treas: Max A Putnam  
**OSGOOD MDIE,** Siskiyou Co.,  
Au, Ag, Pb, Pt, Cr,O<sub>2</sub>, Mn  
100-TON MILL, 1 mi W of Yreka  
Under devel

**EARLY MORNING MNG CO**  
1185 Monterey St, San Luis Obispo  
**EARLY MORNING MINE,** Fresno  
County, Cr  
Idle

**EAST RIDGE CO**  
633 Shatto Place, Los Angeles 8  
Pres: C E Byrne  
VP: F Moldenhauer  
Sec: Alice Davenport  
(See Colo)

**EDGEcumbe EXPLOR CO**  
281 S Hudson, Pasadena 8  
Pres: Mrs Charlotte Morgan  
VP: C A Hale  
Sec: Arnold Holden  
Treas & Gen Mgr: G H Morgan  
(See Alaska)

**EL DORADO LIMESTONE CO**  
Shingle  
Pres: J H Bell  
VP: E O Schneets  
Gen Mgr: C R Nichols  
Sec: H P Arnes  
Mech Eng: Paul Ransom  
**LIMESTONE MINE,** 4 1/2 mi SW of  
Shingle Springs, undergr., limestone  
Mine Supt: F G De Berry  
Prod: 600 tons  
**MILL,** Crushing, Washing, Screening

**EL DORADO - PLUMBAGO**  
MINES CONS, INC  
311 Octavia St, San Francisco  
Pres: Ernest G Heath  
VP: Lewis C Adams  
Sec-Treas: Richard H Wong  
**EL DORADO-PLUMBAGO MINE,**  
Sierra County, Au  
Gen Mgr & Gen Supt: Roland P Degrie  
Geol: Thomas H Taylor

**ENGEL, RENE & ASSOC**  
P O Box 68, Wofford Heights,  
PALA, BIR RAYMOND, B & F,  
**LAST CHANCE MINES,** Kermesse &  
Weldon dists, Kern County, undergr.,  
WO,  
Gen Mgr: Dr Rene Engel  
Prod: 50 tons  
**50-TON GRAV MILL,** Weldon  
Idle

**FAIR OAKS GRAVEL CO**  
4000 Illinois Ave, Fair Oaks  
GRAVEL PLANT, Sacramento  
County, Au

**FAIRFIELD MNG CO, INC**  
831 E Main St, Stockton  
Pres & Purch Agt: LeRoy A Washburn  
VP: Ray Julius  
Sec-Treas: F M Lucaccini  
(See Idaho)

**FAIRVIEW PLACERS**  
Lewiston  
(Joint venture of Sunshine Mng Co &  
The Idaho Canadian Dredging Co)  
Own: Rep & Gen Mgr: H B Murphy  
Purch Agt: A D Scoule  
**PLACER,** 10 mi N of Lewiston,  
8,000 yd bucket dredge, Au, Ag  
Supt: H C Young

**FERNANDEZ, FRANK C**  
1326 Pine St, Santa Monica  
Gen Mgr: George Greve  
**MONO PIUTE RAINBOW MINE,** W  
mi NE of Bishop, undergr., surface,  
Au, Ag, Pt  
**25-TON GRAV MILL,** Piute Canyon  
Idle  
(See Sunday Mng Co, Nev.)

**FIREBOARD PAPER PRO-**  
DUCTS CORP  
(PARCO BLDG MATLS DIV)  
1789 Montgomery St,  
San Francisco 11  
Pres: W L Keady  
VP: B P Altick, E W Fish,  
R R Galloway, A S Halley,  
J F Harvard, O C Major,  
M E Sanford, W K Spence,  
W H Young  
Sec: J S Mitchell  
Treas: V H Erickson  
Gen Mgr: R R Galloway  
(See Colo)

**FIDELITY MINE**  
Columbia  
Mgr: Wayne Stobough  
MDE, Au, Ag  
Supt: Vernon Bay  
**3-TON GRAV MILL**  
Idle

**California**

**FIDELITY MNG CORP.**  
10535 Burord Ave., Inglewood 2  
Own & Pres: L Mills Beam  
**TEMPLE MOUNTAIN MINE**, undergr.,  
U<sub>3</sub>O<sub>8</sub>

**PIPE, E J & E M**  
Star Rt, Box 720, Lucerne Valley  
**BUCKHORN LODE**, SW of Lucerne  
Valley, surface, Au, Ag  
Idle

**HIGH POINT LODE**, NE of Lucerne  
Valley, undergr., Au, Ag  
Idle

**FILLIER, EARL J**  
Coarse Gold, Madera County  
**GOLDEN RIBBON, TEXAS FLAT,**  
& KLIKICKI KLICK GROUP LODES,  
1 mi N of Coarse Gold, undergr., Au  
Idle

**FITZGERALD, SMITH &**  
**ASSOC.**  
Box 586, Placerville  
**CUPPER HILL MINE**, Amador  
County, Ca  
Idle

**FITZHUGH & OSBORN**  
**MNG CO**  
P O Box 208, Templeton  
**LA LIBERTAD MINE**, San Luis  
Obispo County, Hg

**FOOD MACHINERY AND**  
**CHEMICAL CORP., WESTVACO**  
**MIN PROD DIV**  
Box 337, Newark  
Gen Mgr: R F Moran  
Asst to Gen Mgr: D C Linton  
Oper Supt: S M Cimino  
**WESTVACO MINE**, Box 281, Hollister,  
surface, dolomite  
Prod: 550 tons  
Mine Supt: R Swindelhurst  
500-TON MILL, Hollister  
Mill Supt: R Swindelhurst  
Assay: Norman Cusins  
(See N Mex)

**FOREMAN & FOREMAN**  
Box 175, Darwin  
Pres: L D Foreman  
Gen Mgr: R L Foreman  
**DEFENSE MINE**, 11 mi S of Panamint  
Springs, undergr., Pt, Ag  
Idle

**FOREST MINES, INC**  
Forest  
Pres: Cecil T Vivian  
Sec-Treas: Virginia A Vivian  
Gen Mgr: Cecil T Vivian  
**NORTH PORK MINE**, Sierra Cy, Au  
Starting open in 1958

**FRIDAY NICKEL SYNDICATE**  
3105 Wilshire Blvd, Los Angeles 8  
\*Pres: D B MacAfee  
VP: Dudley Cornell  
Sec: Saul J Bernard  
Treas: Marvin L Tragerman  
Tech Dir: M W MacAfee  
**FRIDAY NICKEL MINE**, Julian,  
undergr., Ni, Co, S  
Under devel

**FRYE, HERVEY V**  
c/o Inskip Inn, Stirling City  
**MONEY MUSK MINE**, Butte County,  
open pit, placer, Au  
Idle

**GAMBLE, GEORGE**  
1431 Webster St, Palo Alto  
**KNOXVILLE MINE**, Napa County, Hg  
Idle

**GARCIA, MARINO & KINSELA**  
Midtown  
**JAMES CREEK PLACER**, Napa  
County, Hg

**GARIBALDI BROS**  
Volcan  
**GARIBALDI MINE**, Amador Cy, Au  
Idle

**GARNET DIKE MINE**  
King River Hatchery, Fresno  
**MINE**, Fresno Cy, WO<sub>3</sub>  
Idle

**GENERAL DREDGING CO**  
Watson  
Part: Giddings, Haines & Boucher  
**PLACER**, 2 mi from Polson, drag-  
line, Au, Ag  
Idle

**GENERAL DREDGE #1**, American  
Riv Dist, placer, Au, Ag, Pb  
Idle

**GENERAL MNG CORP**  
5272 Sunset Blvd, Los Angeles  
Pres: E J Speake  
VP: Don Cartt  
Sec: Allan Thody  
Treas: Howard Mallring  
(See Ariz)

**GHEZZI & HARRY**  
156 Tunstead Ave, San Anselmo  
**LAZAR LODE**, Mother Lode dist, Au  
Idle

**GIRBALTER MNG CO**  
18518 Lakewood Blvd, Paramount  
**GIRBALTER GROUP**, Santa Barbara  
County, Hg

**GILES BROS**  
Frederick H & Daniel A Giles,  
Alleghany  
**GENERAL SHERMAN, SPOOLIN**  
LODES  
Idle

**GOLD CROWN LODE**  
(See Gold Crown Mng Corp)

**GILES, JOSEPH P**  
11371 S Stelling Rd, Cupertino  
**HUMMINGBIRD MINE**, Shasta Cy,  
near Redding, undergr., Au  
**GRAV-AMAL MILL**, at mine  
Under devel

**GIPSY MINE & MILL CO**  
11115 Wicks, Sun Valley  
Pres & Gen Mgr: J H Bennett  
Sec-Treas: A E Bennett  
Mill, Sun Valley, open pit,  
WO<sub>3</sub>, Au, Ag  
Under devel  
**80-TON FLOT-GRAV MILL**, Bakers-  
field

**GLADDING, McBEAN & CO**  
2901 Los Feliz Blvd, Los Angeles,  
38  
Pres: C W Plantz  
Sec: H A Eccles  
Treas: E M Dundas  
**PLANTS**, Corcoran, Ingle, Lincoln,  
Pittsburgh, South Gate, Los Angeles  
**MINES**, Amador, Inyo, Kern, Los  
Angeles, Orange, Placer, Riverside,  
San Bernardino & Yuba Cys  
(See Washington)

**GLENN CO**  
703 37th Ave, Oakland 1  
Own & Gen Mgr: George G Glenn  
Gen Supt: Harry Odgers  
**MARBLE SPRINGS MINE**, 12 mi E  
of Coulterville, undergr., Au, Ag, Pb  
**50-TON FLOT MILL**  
Mill Supt: Frank Lane  
Idle

**GLIDDEN CO, THE**  
Box 430, Redding  
Pres: Dwight P Joyce  
Sec: R D Horner  
**BULLY HILL & RISING STAR MINES**,  
Shasta County, undergr., Cu, Zn, Au,  
Ag  
Idle

**GOLD HILL DREDGING CO**  
311 California St, San Francisco 4  
Pres: J J Conney  
Asst Sec: H S Gilbert  
Asst Treas: C A Ames  
Purch Agt: E O Perkins  
**PLACER PROP on Mokelumne Riv**  
in San Joaquin Cy, Feather Riv  
in Butte County bucketline, Au, Ag  
Supt: H L Conney  
Idle

**GOLDEN DEAR MINE**  
495 N Bowling Green, Los Angeles,  
49  
Pres: Ervin J Dear  
**MINE**, Crd Ms, 15 mi N of Losperne,  
undergr., surface, U<sub>3</sub>O<sub>8</sub>, Th, Ag, Au  
Under devel

**GONZALES, PAUL**  
1409 Ford Ave, San Jose  
**WONDER MINE**, San Benito Cy, Hg  
Under devel

**GOOD HOPE MNG CO**  
120 "O" St, Fresno  
Pres & Gen Mgr: J H Loughead  
**MINE**, 30 mi E of Visalia, undergr.,  
WO<sub>3</sub>  
Gen Supt: R Johnson  
Prod: 50 tons  
**80-TON GRAV MILL**  
Mill Supt: R Johnson  
Idle

**GOODHUE, J W**  
Taylorville  
**PILOT MINE**, Genesee, Plumas  
County, surface, undergr., Au, Ag,  
Cu  
Under devel

**GOSSAM CAP MINE**  
Box 296, Ingomar  
Pres: Mrs Ralph Griffen  
VP: Mrs C W Wheeler  
Gen Mgr: C W Wheeler  
Gen Supt: R W Griffen  
Elec Eng: Ed Kamper  
**GOSSAM CAP MINE**, 1 1/3 mi from  
summit of Walker Pass, Chalcopyrite,  
Cu, Au, Ag, V<sub>2</sub>O<sub>5</sub>  
**25-TON FLOT-GRAV MILL**, at mine  
Idle

**GOULD, H W & CO**  
709 Union St, San Francisco  
Own: Malcolm B Gould  
**HELEN MINE**, 6 mi SW of Middletown,  
Lake County, Hg  
Under devel  
(See Klau Mine, Inc)

**GRANTHAM MINES**  
237 N 2nd Ave, Upland  
Pres: Louise Grantham  
**WARM SPRINGS TALC DEPOSIT**,  
Inyo County, Talc  
**BIG TALC**, 48 mi NW of Shoshone,  
Talc  
Mine Supt: John Odgers  
Mine Frm: Tom Hardman  
Mine Engr: R H Franklin

**GREAT LAKES CARBON CORP**  
**MNG & MINERAL PROD DIV**  
**DICALITE DEPARTMENT**

612 S Flower St, Los Angeles 17  
Pres: George Skakel, Jr  
VP & Gen Mgr: D L Marlett  
Op Mgr: E A Harris  
Asst Op Mgr: N V Brown  
Purch Agt: Jay Hughes  
**PLANT #1 (RADAR HILL MINE)**,  
Box 107, Walteria, open pit, dia-  
maceous silica  
**MILL**, Walteria  
Sup: A K Muir  
Asst Supt: Carl P Schuhols  
Frn: Orval Chance  
Ch Chem: E L Neu  
Ch Eng: D F Pyramid  
**PLANT #5**, Box C, Lompoc, 7 mi  
W of Lompoc, surface, dolomite  
**MILL**, Lompoc  
Mill Supt: E D Ingram  
Asst Supt: R W Yocom  
Frn: Martin Grycak & John  
Bradford  
Ch Chem: J J Girard  
(See Gr Lakes Carbon Corp, Colo,  
N Mex, Oreg)

**GREAT LAKES OIL &**  
**CHEMICAL CO**  
417 S Hill St, Los Angeles 13  
Pres: Charles J Hain  
Sec: Richard E Bishop  
Treas: John R Atkins  
**KENNON MINE**, Miracle Hot Springs,  
undergr., U<sub>3</sub>O<sub>8</sub>  
Under devel

**GREEN, SHERWOOD**  
219 S "D" St, Madera  
**ACE PLACER**, Madera County, Au  
**JENSEN PLACER**, Friant dist, Au  
Idle

**HAMPTON MNG CO, CHROME**  
**DIV (Subsidy of CONSOL)**  
**VIRGINIA MNG CO, Nevada**  
274 S LaPlaya Park Place,  
Los Angeles  
Treas: T E Wilson  
**SAWMILL CREEK MINE**, San Benito  
County, open pit  
Gen Mgr: Joseph R Holman  
Gen Supt: Jack M James  
Prod: 50 tons  
**100-TON MILL**  
Mill Frm: Don Sking

**HARRIS, MICHAEL**  
c/o Furnace Creek Ranch,  
Death Valley  
**KEANE WONDER EXTENSION LODE**,  
Caliente Cliff dist, Au, Ag  
Idle

**HAZEL CREEK MNG CORP**  
Box 3606, North Sacramento  
Pres, Gen Mgr & Purch Agt:  
Richard Bonnes  
VP: J Dickeson Bonnes  
Sec-Treas: Edwin Wilder  
**HAZEL CREEK MINE**, Box 287,  
Pollock Pines, 6 mi SE of Pollock

Pines, undergr., Au, Ag, Pb, Za  
Mine Supt: John Coopers  
Ass't Supt: Martin Humbird  
Elec Eng: Carl Weyel  
Prod: 50-100 tons  
**FLOT-MILL**, Hazel Valley  
**SIMELTER**, Selby

**HEATHER, HARRY F**  
236 S Oak Knoll Ave, Pasadena  
**BRIGHT OUTLOOK MINE**, San  
Bernardino Cy, Cu, Pb  
**6 DAUGHTERS**, Needles, undergr.,  
U<sub>3</sub>O<sub>8</sub>, bentonite  
**OVERSITE MINE**, Amboy, open pit,  
pumice  
Idle  
(See Ariz)

**HELMKE, THOMAS &**  
**JANSSEN**  
24 California St, San Francisco  
**LAMBERT, LITTLE CASTLE CREEK,**  
COSTA, CROW CREEK, FOREST  
QUEEN MINES, undergr & open pit,  
Cr  
Gen Mgr: O A Fulgham  
Mine Supt: Verl Price  
Mine Frm: C A Barton  
**150-TON GRAV MILL**, Castella  
Mill Supt: C R Robinson

**HERBERT, O A**  
Box 67, Plymouth  
**WOLIN PROPERTY**, Mother Lode  
dist, placer, Au  
Idle

**HERBERT MINES**  
Rt 5, Box 150A, Porterville  
**TUNGSTEN MINE**, Tulare Cy, WO<sub>3</sub>  
Idle

**HIGH NOON MINE**  
Furnace Creek Ranch  
Op: Ralph S Dahl  
**MINE**, Wildrose dist, undergr &  
surface, scheelite  
Idle

**HILLEN HOLDING, MNG CORP**  
1350 N Lemon, Menlo Park  
Pres: Wm C Holding  
VP: P C Hillen  
Sec: Keith Petty  
Treas: Keith Garner  
**SONORA URANIUM MINE**, Mono  
Cy, undergr, open pit, U<sub>3</sub>O<sub>8</sub>  
Gen Mgr: W C Holding  
Supt: P C Hillen  
Prod: 20 tons

**HILLTOP TUNGSTEN MINE**  
Sanger, c/o E G Peron, Trimmer  
Rt, Maxon's Store  
**MINE**, 18 mi E of Trimmer, undergr,  
WO<sub>3</sub>  
Idle

**HOFFMAN, JOHN D**  
758 Marsh St, San Luis Obispo  
**IRONCROSS & SWEETWATER MINES**,  
San Luis Obispo Cy, open pit, Cr  
**150-TON GRAVITY MILL**

**HOLDING MINE & DEVEL CO**  
10 Campo Bello, Menlo Park  
Pres: Wm C Holding  
VP & Gen Mgr: P C Hillen  
**SHOESTRING TUNGSTEN MINE**,  
Mono Cy, Tioga Pass near Lee  
Vining Canyon, undergr, WO<sub>3</sub>, Mo  
Idle

**HOLMAN, J R**  
1465 E Orange Grove Ave,  
Pasadena 7  
**BONNELL STATE LEASE**, Coalanga,  
open pit, Cr  
Gen Mgr: J R Holman  
Asst Gen Mgr: H A Pimbrott  
Supt: Richard Wilder  
Prod: 50 tons  
**MISTAKE MINE**, 20 mi W of  
Coalanga, open pit, Cr  
Idle

40-TON GRAV MILL, White Cr  
Supt: F W Wilder, Jr

**HOLMESTAKE MNG CO**  
Box 308, Winterhaven  
Pres & Gen Mgr: K A Holmes  
Asst Gen Mgr: Leo Hardy  
**CARGO MUCHACHO GROUP**,  
Imperial Co  
**CASTLE DOME FLUORSPAR**,  
Imperial Co  
**125-TON FLOT MILL**, 4 mi W of  
Winterhaven  
Mill Supt: James G Hardy  
Assay: Harvey Hardy  
(See Arizona)

## California

**HOMESTAKE MNG CO**  
10 Bush St, San Francisco  
Pres: Donald H McLaughlin  
VP: A H Shoemaker  
VP: James W Swent  
Sec-Treas: John W Hasilton  
Gen Mgr: J O Harder  
(See So Dak, Utah, Wyo)

**HOPE SO MINE**  
c/o R W Leslie, 2118 Eureka Way, Redding  
MINE, undergr., Au, WO<sub>3</sub>  
Gen Mgr: R W Leslie  
Idle  
**15-TON JIG MILL**

**HUNTLEY INDUSTRIAL MINERALS INC**  
Box 205, Bishop  
Pres: W H Huntley  
VP: D T Davis  
Sec-Treas: Cecile M Huntley  
COLTON MINE,

**HUNTLEY INDUSTRIAL MINERALS INC**  
Box 205, Bishop  
Pres: W H Huntley  
VP: D T Davis  
Sec-Treas: Cecile M Huntley  
COLTON MINE, 20 mi NE of Bishop, open pit, pyrophyllite  
LAWRENCE MINE, 5 mi S of the Mountain in Utehebe Range, open pit asbestos  
PACIFIC PYROPHYLLITE MINE, 20 mi N of Laws, open pit, pyrophyllite  
TUNGSTEN CITY TUNGSTEN MINE 7 mi W of Bishop, open pit & undergr., WO<sub>3</sub>  
**HUNTLEY TALC MINE**, 43 mi SE of Big Pine, undergr. open pit, talc  
Prod: 10 tons

**LITTLE ANTELOPE CLAY MINE**, Ho Creek, Mono Cty, open pit, White Kaolin Clay  
Mine Sup: D T Davis  
Prod: 250 tons

**HUNTLEY NON-METALLIC MILLS**  
Laws, talc, pyrophyllite, mica, feldspar, clay  
Prod: 6,000 tons per month  
(See Ariz.)

**IDAHo MARYLAND MINES CORP**  
Box 1028, Grass Valley  
Pres & Gen Mgr: Bert C Austin  
VP & Ass't Gen Mgr: Max Beckfield  
Sec-Treas: C L Allan  
BRUNSWICK KITE MINE, 2 1/2 mi NW of Grass Valley, undergr., WO<sub>3</sub>, Au, Ag  
Prod: 40 tons WO<sub>3</sub>, 20 tons Au  
**750-TON GLOM MILL**, Grass Valley  
Mill Frm: Oliver Peterson  
Idle  
(See Utah)

**IGO MINING CO**  
Box 1412, Redding  
Pres: R B Tupper  
Gen Mgr: M E Hawe  
MEG WYKE MINE, Au, Ag, Pb, Zn  
**YANKEE-JOHN MINE**, Au, Ag, Pb, Idle  
Miller

**INDUSTRIAL MINERALS & CHEMICAL CO**  
6th and Gilman Sts, Berkeley 10  
Pres: L R Moretti  
VP: W S Cowgill  
Sec-Treas: A L Forbes  
**SPANISH MINE**, Nevada Cty, barite  
Idle  
**MILLS**, Berkeley and Florin, non-metallic  
Mill Sup: Forrest Rhoden  
(See Nev)

**INYO MARBLE CO**  
4708 N Muscatel Ave, Rosemead (Exec Hwy), 728-732 E 29th St, Los Angeles 11  
Pres & Treas: D H Dunn  
VP: L R Glover  
Sec: C A Cravens  
**CONSOL INYO PROPERTIES**  
Dolomite via Lone Pine, surface, marble, limestone, dolomite, quartzite  
Gen Mgr: D Haven Dunn  
(Quartzite properties leased to Gladding, McBean & Co and General Refractories)  
(Marble & dolomite leased to Lone Pine Company)

**INYO SOIL SULPHUR CO**  
310 Pacific St, Bakersfield  
**CRATER CLAIMS**, Inyo County, S

**IRELAN YUBA CO, LTD**  
1921 Stockton Blvd, Sacramento  
**IRELAN MINE**, Sierra County, Ag  
Idle

**J & W MINING CO**  
Corvallis, Ore  
Pres: Norman Johnson  
Sec-Treas: Chas S Wilson  
**TYSON CHROME MINE**, Gasquet 30 mi NE of Crescent City, undergr., surface, Cr  
Sup: William Whippo  
Cons Eng: K O Watkins

**JANETT, E P**  
1894 Sheldon Ave, Sun Valley  
**AURORA MINE**, New Idria Dist, San Benito Cty, surface, Hg

**JANZEN, PETER**  
Gasquet  
**CHROME HILL, ELK CAMP**, Patrick's Cr, Butte Cty, Cr

**JOHNS-MANVILLE PRODUCTS CORP**  
Lompoc  
Plant Mgr: O B Westcott  
Ass't Mgr: G G Schaeckert  
MINE, Lompoc, surface, diatomaceous silica

Quarry & Mine Sup: C W Spar  
Ass't Sup: E W Hodges  
Gen Frm: O C Benedict  
Eng: D E Henschwander  
Mine Sup: C W Spar  
Eng: E W Hodges  
Mill, at mine  
Mill Sup: G W Porter  
(See NY)

**WALTER W JOHNSON CO**  
141 Battery St, San Francisco  
(See Brinker-Johnson Co, Alaska)

**JOLLY JACK URANIUM CO**  
2550 - 28 Ave, San Francisco 16  
Pres: Richard H Hall  
VP: Vernon R Aiken  
Sec-Treas: Stanley S Dunnaway  
(See Utah)

**JOUBERT PLACER MINE**  
Sawyers Bar  
Own: Louis J Joubert  
**HYDRAULIC PLACER**, Au, Ag  
(Leased by Strawacker & Hartnett)  
Idle

**JUDGE HYDRAULIC MINE**  
Sawyers Bar  
**PLACER**, Siskiyou Cty, Au  
Idle

**K P P & F MNG CO**  
Box 1, Igo  
**TROUT CREEK, BARRY CREEK, BLACK BEAR, LUCKY SUNDAY MINES**, Trinity County, Mn  
Idle

**KAISER ALUMINUM & CHEM CORP**  
1924 Broadway, Oakland 12

Pres: Henry J Kaiser  
VP: D A Rhodes  
Sec: Wm Marks  
Treas: R A Clayton  
Purch Agt: Duncan Gregg  
Mgr, Chem Div: F M Cashin  
Geol: E A Hasson  
**NATIVIDAD PLANT**, Box 1531, Natividad  
Works Mgr: J F Knight  
Gen Sup: D M Kerr  
Ass't to Mgr: Wm Burns  
Plant Sup: Ivan Hall  
Mech Eng: J E Winter  
**HEAVY-MED MILL**, Natividad

**KAISER STEEL CORP**  
1924 Broadway, Oakland 12  
Pres & Chmn of Bd: Henry J Kaiser  
VP & Gen Mgr: Jack L Ashby  
VP & Sec: William Marks  
VP & Treas: Atwood Austin  
Gen Purch Agt: G W Kelly  
**EAGLE MOUNTAIN MINE**, Box 159, Eagle Mountain, surface, Fe  
Mine Mgr: Martin J Hughes  
Mine Geol: R W Brummett  
Mine Frm: W A Horton  
Mine Eng: C E Davis  
Master Mech: C A Scott, Jr  
15,000-TON MILL, at mine, heavy media & jiggling  
Mill Sup: C W Reno  
Benefit Plant Frm: R P Wentzell  
Prod: 10 tons

**NIGHT SHIFT BENEFIC FRM**: J D Hill, J J Statler  
**BLAST FURNACE**, 1,314,000-ton capacity, Fontana  
Iron & Steel Div Sup: J D Faussman  
Supt, Blast Furnaces: R B Newmeyer  
Works Mgr: B N Dagan

**KEANE EXTENSION MNG CO**  
Box 224, Beatty, Nev  
Own: Michael & James Harris  
**MINE**, Death Valley, Inyo County, undergr., Au, Pb, Fe, Ag  
Idle

**KELLY, T C**  
Hayfork  
**KELLY MINE**, 5 mi NE of Hayford, undergr., Au, Ag  
Idle

**KENNEDY MINERALS CO INC**  
2550 E Olympic Blvd, Los Angeles 23

Pres: John J Kennedy  
VP: A F Escobar  
Sec: Paul H Wayne  
Treas: Fred L Clover  
**ECLIPSE**, Inyo County  
**TALC AND DEATH VALLEY**, Inyo County

**KEROON MNG CO**  
318 Taylor, Taft  
Own: Jack I Kerns  
W T Waggoner  
**KEROON MINE**, Box 8, Star Rd, Kernville, undergr., U<sub>3</sub>O<sub>8</sub>  
(Oper by Great Lakes Oil & Chem Co)

**KERN COUNTY LAND CO**  
600 California St, San Francisco  
Pres: George Montgomery  
VP, Oil & Minerals: H L Reid  
Chief Geol: WM Griswold  
Explor: Ust Ush

**KERN URANIUM CO**  
P O Box 183, Rio Vista  
Pres & Gen Mgr: Lloyd Scouller  
VP: J H Baumann  
Sec: S W Gardner  
**LITTLE SPARKLER #4**, Box 1048, Isabella, undergr., U<sub>3</sub>O<sub>8</sub>  
Geol: Al B Scouller  
Mine Sup: Vern Harrington  
Mine Frm: William Moreland  
Cons Eng: L V Ivanhoe  
Prod: 7 tons

**KEYSTONE COPPER CORP**  
Box 7, Nevada City  
**MINE**, Nevada City, Au, Ag  
Idle

**KEYSTONE MINE**  
Agent: H G O'Hanlon for Martin  
Ares, Sutter Creek  
**KEYSTONE MINE**, Mother Lode dist, Au, Ag, Cu  
Idle

**KIMBROUGH, WILLIE A**  
8804 Compton Ave, Los Angeles 2  
**SUNRISE #1, #2, #3 & LUCKY BILLIE CLAIMS #1, #2, #3, #4**, Oro Grande mng dist, San Bernardino County, Au, Ag, St, Pt  
Idle

**KING & KING**  
Box 545, Big Bear Lake  
**LUCKY #1**, 8 mi NE of Oro Grande, undergr., Au  
Idle

**KINGSTON LEAD MNG CO**  
4060 Beverly Blvd, Los Angeles 4  
**KINGSTON LEAD MINE**, San Bernardino County, Pb, Ag  
Trustees: Arthur C LaBrus

**KNEPPER, L W**  
Box 87, Indio  
**SANTA RITA, SANTA ANITA, SAN CARLOS MINES**, New Idria Dist, San Benito & Fresno Cty, surface, Hg  
**EL CAJON MINE**, Panache Dist, San Benito Cty, surface, Hg  
**NORTH STAR MINE**, San Benito Cty, surface, Hg  
Prod: 10 tons

**KOKO WEEP CO, LTD**  
.c/o D M Hodson  
634 S Spring St, Los Angeles 14  
**CARBONATE KING ZINC MINE**, San Bernardino Cty, Zn, Ag  
Idle

**KORFIST, JERRY**  
Box 75, Baker  
**ORE PINE MINE**, 13 Mi E of Baker, undergr., open cut, Au, Ag  
Idle

**KRITKOS, W T**  
3125 W Euclid Ave, Stockton  
**OAT HILL MINE**, E Mayacamas Dist, Napa Cty, Hg  
Prod: 10 tons

**KUBON & JURVA**  
419 N Emily, Anakeim  
**RARD MINE**, Kern Cty, Ojaiville, WO,  
Idle

**LA GRANGE GOLD DREDG**  
1905 Mills Tower, San Francisco 4  
Pres: Henry Eickhoff, Jr  
Sec-Treas: Jefferson Koellis  
**PLACER**, La Grange, dredge, Au Pt, Ir  
Idle

**LA PURISSIMA MNG CO**  
c/o Mr Fortini, 14184 Alameda Rd, Los Gatos  
**NEW ALMADEN**, Santa Clara Cty, Hg

**LARIO, JOE P**  
Box 75, New Idria  
**SAMSON PEAK MINE**, San Benito Cty, Hg  
Idle

**LEWIS FOOD CO**  
817 E 16th St, Los Angeles 21  
(See Black Bull Mine, Idaho)

**LINCOLN CLAY PROD CO**  
Box 387, Lincoln, Jr  
Pres: M J Gillman, Jr  
VP: K S Brown  
Sec-Treas & Purch Agt: A Gulliford  
**MINE**, 1 1/2 mi N of Lincoln, open pit, fireclay  
Mine Frm: C O Pardee  
Prod: 450 tons  
**60-TON MILL**

**LIPPINCOTT LEAD MINES**  
Box 1811, Santa Ana  
OWN: George Lippincott  
**LEAD KING MINES**, Death Valley, Ag, Pb, Zn  
Sup: Gene Taylor  
Prod: 50 tons  
**25-TON GRAV FLOT MILL**, furnace  
Sup: Neuman Blek  
**SMELTER**, Bonnie Clare, Nev

**LITTLE JULIA GROUP QUARTZ MINES**  
Shasta  
Own: Eldred M Bickling, R E Bickling, C E Plumb  
**LITTLE JULIA MINE**, Shasta, undergr., open pit, Au  
Under devel

**LIVE OAK MINES, INC**  
25550 N Sand Canyon Rd, Saugus  
Pres & Gen Mgr: Chaloner Thompson  
VP: Thomas E Jackson  
Sec-Treas: L B Thompson  
**MINE**, open pit, titanium, sircon, hafnium, Fe  
Met: Victor Jager  
Geol: H C Babbitt  
Chem Eng: Samuel Sklarow  
Under devel

**LONE STAR MINE**  
Topaz  
Own: Wm B Taylor, Lou Barnett  
**MINE**, 2 mi W of Coleville, open pit, WO<sub>3</sub>, Sup: Wm B Taylor  
Idle

**LUCKY BLACK JUNIOR MINE**  
Baker  
Own & Op: Charles B Foster, 180 Eureka St, San Francisco  
**MINE**, 40 mi from Shoshone, surface, Mn  
Idle

**LUCKY JACK MNG CORP**  
10535 Buford Ave, Inglewood 2  
Pres: L Mills Beam  
VP: Harold D Kinney  
Sec-Treas: Bess J Beam  
**LUCKY JACK MINE**, Strawberry Valley, placer, Au, Pt  
Gen Mgr & Met: Major Alfred

**California**

**MACCO CORP., BARITE DIV**

14488 S Paramount Blvd  
Pres: John MacLeod  
VP: John Robinson  
Dir Mgr: J D Hawkins  
Gen Supt: Harry Parker  
Purch Agt: Neil Giebler  
BARITE QUEEN MINE, Box 266,  
Inyokern, open pit, barite  
Mine Supt: Clark Everest  
Prod: 300 tons  
200-TON GRAV MILL, Hwy 305,  
8 mi S of Little Lake  
Mill Supt: William Paine  
(See Western Barber Corp)

**MANGANESE KING MINE**

Box 241, Parker, Arizona  
Own: W Paul Robison  
Op: D R Harrymann  
MINE, 9 mi W of Parker Dam, sur-  
face, Au  
Idle

**MARQUIS MNG CO**

West Point  
(c/o James M Marquis  
MARQUIS MINE, Calaveras Cty, Au

**R W MAXWELL CO**  
P O Box 574, Sonora  
Pres: R W Maxwell  
MINE, open pit, dolomitic limestone  
MILL, Columbia Marble Quarry

**MC GUIRE MNG CO**  
39 Palma  
Op: Clyde F McGuire  
MISSION MINE, Riverside Cty, Au  
Idle

**MERITAL EXPLOIT CO**  
510 North 4th St, Blythe  
REAL MC COY MINE, Riverside Cty,  
open pit, UO  
Under devl

**WAR EAGLE MINE**, Riverside Cty,  
open pit, Mn  
Gen Mgr: W A Caproni  
Under devl

**MINERAL MATERIALS CO**  
1145 Westminster Ave, Alhambra  
Gen Mgr: C W Damon  
ATLAS SILICA MINE, P O Box 394,  
Ore Grande, surface, silica quartzite  
Gen Supt: H E Hill  
Mine Frmr: Lloyd Balles  
Ch Eng: M W Redhead  
Prod: 200 tons  
800-TON MILL, Ore Grande, jaw  
crusher & rolls  
(See Nevada)

**MIRACLE MNG CO**  
(See Wyoming Gulf Sulphur Co)

**MOLYBDENUM CORP OF AMERICA**  
Nipton

Gen Mgr: H D Bailey  
Asst Gen Mgr: Russell Wood  
Met: H S Woodward  
MT PASS MINE, 60 mi SW of  
Las Vegas, Nev, open pit, rare  
earth metals  
Mine Frmr: Ira Proud  
Prod: 150 tons  
200-TON FLOT MILL  
Mill Supt: G H Lee  
Assay: Ralph Porter  
(See Colo, N Mex, NY, Pa)

**MORRIS RAVINE MNG CO**  
Box 7, Oroville  
Pres & Gen Mgr: J H Sharpe  
VP: Roy A Hundley  
Sec: J R Peterson  
MINE, 6 mi NE of Oroville, undergr,  
Au

**MOUNT GAINES MINE**  
Hornitos  
Own: J W Radil, 444 California St,  
San Francisco 4  
MT GAINES MINE, Hornitos,  
undergr, Au  
Supt: J A Siefer  
80-TON FLOT MILL  
Under devl

**MOUNTAIN COPPER CO OF CALIF.**  
230 California St, San Francisco 11  
Pres: L T Kett  
Sec: Dudley F Miller  
Treas: E G Rebecker  
Purch Agt: S D Dodds  
Sales Mgr: M M Stockman  
IRON MTN MINE, Matheson Station,  
Redding, iron pyrites  
VP: Op: C W McCleung  
Ch Eng: R K Barcus  
Pl Frmr: W H Calburn  
Prod: 500 tons

**MT DIABLO MINE**

Contra Costa County  
MINE, Hg  
Idle

**MT SHASTA ASBESTOS CO**  
Mt Shasta  
EDDY CREEK MINE, Shasta County,  
asbestos  
Under devl

**MUGWUMP MNG CO, INC**  
Forest

Pres: Virginia A Vivian  
VP: Dr Steven T Mayes  
Sec-Treas: Fred W Rollyson  
Purch Agt: Cecil T Vivian  
MUGWUMP MINE, Sierra Cty,  
undergr, Au

**MULTI-MINES CCP**

2550 E Olympic Blvd,  
Los Angeles 23  
Pres: John J Kennedy  
VP: A F Escobar  
Sec: Paul H Wayne  
Treas: Fred L Clover  
DEATH VALLEY TALC MINE,  
Inyo County, talc  
IBEX MINE, Inyo County, clay

**MAT'L LEAD CO., BAROID DIV**

3404 Danville, Houston, Texas  
HECTOR MINE & PLANT, Newberry,  
undergr, bentonite  
Supt: Jack Herford  
MERCEZ MILL, Merced, dry  
grinding of barites  
Supt: Less Bunch  
(See Arka, Kana, La, Mont, Mo, Nev,  
NY, Tenn, Tex, Wyo)

**NATIONAL TUNGSTEN CORP**  
9019 Wilshire Blvd, Los Angeles

Pres: Sol Posner  
Sec: M Kaufman  
Treas: Paul Hewitt, Jr  
TYLER, ROUNDSVILLE, WISSEMAN  
MINES, 140 N Main St, Porterville,  
undergr & open pit, WO  
Prod Eng-Chg of Oper: J Paul Jones  
Mine Supt: James Mitchell  
Mine Frmr: C Moore  
Geo: G T McCall  
Prod: 100 tons  
100-TON GRAV MILL, near Calif Hot  
Springs  
Mill Supt: Glen Wilder  
Mill Frmr: H West  
Idle

**NATOMAS COMPANY**

607 Forum Blvd, Sacramento  
Pres & Gen Mgr: R G Smith  
VP: Mortimer Fleischacker, Jr  
Raymond W Ickes  
VP & Sec-Treas: Chandler Ide  
Asst Sec-Treas: Wanda Durkee  
Chmn of Bd: R K Davies  
Mgt Gold Dredging Dept: Cyril Thomas  
PLACER MINE, Natoma, 20 mi E of  
Sacramento, Au  
Sec Coln

**NELSON MINE**

Box 124, Eureka  
Op: Dayton Murray  
PLACER MINE, 6 mi N of Orleans,  
Au  
Idle

**NEW CHAMPION MINING CO**

West Point  
CENTENNIAL MINE, undergr, Au,  
Ag, Pb  
Supt: H G O'Hanlon, Jr  
Frmr: Dean Aggett  
FLOT MILL  
Supt: R H O'Hanlon  
Idle

**NEW IDRIA MNG & CHEM CO**

Hdrls  
Pres: C Hyde Lewis  
Sec-Treas: M A Burgess  
QUICKSILVER DIVISION, Idria,  
San Benito Cty, undergr, Hg  
Div Supt: Wesley Shaddock  
Geo: Robert K Linn  
Mine Frmr: Victor Sola  
Mills, at mine  
STRAWBERRY TUNGSTEN DIVISION,  
1950 Tyler St, Fresno, undergr, WO  
Div Mgr: Milan C Richardson  
Idle

**NORTHWESTERN MINING CO**

P O Box 3781, Seattle 24, Wash  
Own: Alfred W Peeler  
BOULDER GULCH GROUP, 8 mi W  
of Sawyers Bar, Shasta County,  
placer, Au  
Supt: A Everett Miller  
Idle

**OMEGA CO**

Emigrant Gap  
OMEGA MINE, Nev Cty, hydraulic, Au  
Idle

**ONTOP MINE**

Meadow Valley, via Quincy  
Own: H E Fowler  
MINE, 3 1/2 mi S of Bucks Lake,  
undergr, Au, Ag  
Under devl

**6-TON GRAV QUARTZ MILL**

**ORIGINAL 16 TO 1 MINE, INC**

1611 Russ Blvd, San Francisco 4

Pres-Gen Mgr: Wm Maxfield

Sec-Treas: Jack Maxfield

VP: C A Bennett

MINE, Alleghany, Au, Ag

Gen Supt: C A Bennett

Frm: W C Hart

150-TON CONC & AMAL PLANT

Mill Frmr: J B Hunley

**ORTEGA MNG CO**

117 Sprague St, Santa Ana

Officials: V P Anderson,

Earl Prevert

OLD DOMINION MINE, 6 mi W of

Elsinore, undergr, Pb, Zn, Ag

Idle

**OWL SPRINGS CO., INC**

(Joint Venture Group)

2001 W Artesia Blvd, Torrance

OWL HEAD MINE, San Bernardino

County, Min

**PACIFIC CLAY PRODUCTS**

Box 2178 Term Annex, Los

Angeles 54

Pres: J D Fredericks

Exec VP: Kenneth Barretts

Sec-Treas: Walter M Colley

Purch Agt: Mary Ballie

PITS, Amador, Calaveras, Orange,

Riverside, San Diego, San Joaquin

Counties, clay & sand

FLOT MILL, Camanche

Mill Frmr: Jack Hamill

Met & Sand Plant Mgr: Hugh Coke

**PACIFIC FLUORITE CO OF CALIFORNIA, INC**

9612 Flower Ave, Bellflower

Pres & Gen Mgr: James J Grobb

VP & Gen Supt: Sherman M Lineberry

Sec: Ralph R Burrows

Treas: Max H Falor

PACIFIC FLUORITE #1-7, Valley

Wells Station, Nipton, Clark Mt

mug dist, San Bernardino County,

undergr & open pit, CaF<sub>2</sub>

Mech Eng: Fred Mitchell

Mkt: Herb Wendorff

Elec Eng: Bill Sterling

Assayer: E Eisenhauer

100-TON FLOT MILL, near mine

**PACIFIC INDUSTRIES, INC**

Box 880, San Jose

Pres: Donald D Smith

VP: R H Plant

Sec-Treas: Ronald Bailey

Purch Agt: Nick Eliskovich

CENTRAL EUREKA MINE, Sutter Cr,

undergr, surface, potash, P, V,

UO

Gen Mgr: Nick Eliskovich

Geo: Robert D McDonald

Sec Coln

**PACIFIC INSTITUTE**

3101 Pasadena Ave, Los Angeles 31

Pres: H A Shiffer

VP: Res James

Sec: E Beaumont

Purch Agt: W Werneck

KERN FOURTEEN MINE, undergr,

WO

Sec Coln

**PACIFIC MINERALS CO., LTD**

337 - 10th St, Richmond

Pres: C L Renwick, Jr

Sec: T H DeLaP

PLACERVILLE & SHINDOLE

SPRING MINES, asphalt, soapstone,

slate roofing granules

Mine Supt: G H Bishop

MILL

Supt: Ed Bishop

MINE, Willits

Supt: Curt Wilson

MINE, Box 506, Eureka

Supt: Don Boughton

Idle

**PACIFIC MNG CO**

6327 Santa Monica Blvd,

Los Angeles 30

PINE TREE MINE, Mariposa Cty, Au

Idle

**PALO ALTO MNG CORP**

14900 Coleman Rd, San Jose 24

Pres: S S Ridgeley, Sr

VP: George E Carlson, Fred W Smith

Sec-Treas: Virgil R Herring

MINES, Santa Clara & Alameda Cty,

undergr & surface, Hg Cr<sub>2</sub>O<sub>3</sub>

Gen Mgr: G E Carlson

Prod: 10 tons

GUADALUPE MINES, (Carillo, Deep

Purple, Hillsdale, Cedar Mountain)

open pit, Hg, Cr<sub>2</sub>O<sub>3</sub>

Field Supervisor: Virgil R Herring

30-TON GRAV MILL, 8 mi S

of San Jose Coyote Rd

SMELTER, Guadalupe, retort and

continuous feed

Prod: 150 flasks

**PANCO MNG CO**

5612 Fremont St, Oakland

BENTLEY RANCH MINE, Petaluma

Dist, Marin Co, surface, Hg

Idle

**PANOCH VALLEY QUICK-SILVER MINES**

Box 31, Palmdale

LONE OAK & VALLEY VIEW MINES,

San Benito County, Hg

Idle

**PERLITE INDUSTRIES, INC**

Tecopa

Pres & Gen Mgr: Charles H Harrington

Sec: C H Harrington

VP: Kenneth B Hyong

Treas & Mgr: William E Hyong

VP & Mine Supt: W R McGowen

Sec & Mill Supt: Ralph C Harrington

GREY EAGLE MINES #1, 3 & 3

Tecopa, surface, Hg

Asst Mine Supt & Purch Agt:

B B Bedeyek

Asst Mill Supt: Charles Waugh

Mill Frmr: John Wheat

Mech Eng: Walton R Hassell

100-TON FURNACE

**PERMIT MNG CORP**

1083 Howard St, San Francisco

PERMIT MINE, Mariposa Cty, Au

**PERON MNG & MLG CO**

Piedmont

Pres & Gen Mgr: EG Peron

Sec: Mrs Julia Peron

L & M MINE, Baile Camp via Fresno,

WO

Idle

**PETERSON, HARRY**

Box 53, Murphy's

WESTERN MINE, Sheep Ranch Dist,

Au

**PHILLIPS, H. J.**

1361 Chase Ave, El Cajon

PHILLIPS MINE, 2 mi SE of El

Cajon, undergr, Au, Cu, Pb

AMAL-GRAY MILL

Under devl

**PIERCE BROS**

585 2nd St, Morro Bay

HARD FACE GROUP, 1 1/2 mi SW

of Cerro Alto Lookout, San Luis

Obispo County, surface, Cr

25-TON MILL, 8 mi from Morro Bay

**PIERCE & PETERSON**

124 Atkinson Lane, Watsonville

LITTLE KING MINE, Parkfield

Dist, Kings County, surface, Hg

**PIMA MNG CO**

Pacific Mutual Bldg,

Los Angeles 14

Pres: H T Mudd

VP: A R Thomas, A Christensen

H S Hye, P W Allen

Sec: D Evans

Treas: C W Six

(See Aris)

**PIONEER MNG CO**

330 Polk St, San Francisco

Pres: G J Stempel

CAMBRIDGE PLACER, 2 1/2 mi E

of N Fork, American Riv

Idle

**PIONEER PYROPHYLLITE PRODUCTS**

Box 688, Chico Vista

Pres & Gen Mgr: Farvar Matthews

Sec: Dorothy Benson

Elec Eng: Jim Vine

Mech Eng: Robert Wilson

MATTHEW MINE, near Del Mar,

surface, fire clay, pyrophyllite

Mine Frmr: Elliott Williams

200-TON MILL, dry air flotation

**PITTSBURGH PLATES GLASS CO**

Bartlett  
Mgr: George D Dub  
MINE at Bartlett, Inyo City, chemicals  
Ass't Sup't: Clark Dodge  
Chief Chem: O M Knowles  
Master Mech: G E Synder  
Idle

**PLACERVILLE GOLD MNG CO**

56 Clark St, Placerville  
Pres: Reginald Owen  
VP: Lillian Noland  
Sec-Treas: L F S Holland  
**PLACERVILLE GOLD MINES**, undergr., surface, placer, Au, Ag  
Idle

**POWHATAN MNG CO**

6721 Windsor Mill Rd  
Baltimore, Md  
Pres & Gen Mgr: P A Mett  
VP & Sec't Ch Silver  
Treas: E L Farley  
Off Mgr: F E Mett  
**SHASTA COUNTY MINE**, open pit  
asbestos  
Gen Mgr: J C Kompanee  
See Gal

**PROVIDENCE TUOLUMNE GOLD MINES, LTD.**

210 Post St, San Francisco  
Pres: Hert C Austin  
VP: C C Celeste  
Sec: F Grotzke  
**'PROVIDENCE MINE**, 1 1/2 mi SE of Sonora, undergr., Ag  
Idle

**COPPER BLUFF MINE**, Humboldt County, undergr., Cu, Ag, Zn  
Gen Mgr: J MacGinnis  
Mine Sup't: Paul Contini  
150-TON PLOT MILL, 2 mi N of Hoopa  
Mill Sup't: Ralph Hutchins  
Asst Mill Sup't: Lorraine McLenan

**QUARTZ HILL MNG CO, INC**

Scot Bar  
Pres: L J Cuneo  
VP: Clarence Garboit  
Gen Mgr: R R McGinnis  
Sec: J L Seligman, Jr  
**QUARTZ HILL MINE**, Scott Bar, Siskiyou County, surface, Au, Ag  
Idle

**250-TON GRAV MILL**, Scott Bar

**RADIL, J. W**  
446 California Street, San Francisco 4  
**MT GAINES MINE**, Hornmine, undergr., Au  
Gen Mgr: J W Radil  
Sup't: J A Steffert  
88-TON PLOT MILL  
Under devel

**RARE METALS CORP OF AMERICA**

1st Security Bldg, Salt Lake City, Utah  
**RARE 1-12 CLAIMS**, Del Norte City, N.M.

Idle  
**ALTOONA MINE**, Box 18, Dunsmuir, undergr., Ag  
Mine Sup't: C. Ayers  
Geol: S D Barber  
Under devel  
(See Aris, Idaho, Utah)

**RINCONADA QUICKSILVER MINE**

Star Rt, Box 37A, Santa Margarita  
Own: G P Bell  
**RINCONADA MINE**, 12 mi E of Santa Margarita, Ag  
Idle

**RIVER ROCK INC**

Mgr: B M Dolan  
**GRAVEL PIT**, Merced County

**ROSSI HILL MINE**

Box 181, Bishop  
Own: J Rossi  
MINE, 4 mi S of Bishop, undergr., surface, WO<sub>3</sub>, Op: Harry Dridit, George, Leslie, Andy Grasseel  
Idle

**RYBERG, F E**

Couletteville  
**CAL-PENN-TEX GROUP**, Mother Lode dist, Mariposa City, Au, Ag  
Idle

**S P LODGE MINE**

1361 Chase Ave, El Cajon  
SP MINE, 7 mi S of Octillo in Davies Valley, Imperial City (Octillo is on Hwy 80), undergr., open pit, WO<sub>3</sub> (Schelite) 3 acre outcrop Under devel

**S & C MNG CORP**

510 Hobart Bldg, San Francisco  
Bob Hubman, W H Castle  
**BLACK DIAMOND MINE**, Colusa County, Mn  
**RATTLESNAKE, SOUTH THOMAS MINES**, Mendocino County, Mn  
**WHITE ROCK MINE**, Lake City, Mn  
Idle

**SALMON RIVER MINES CO**

Callahan  
Pres & Gen Mgr: E C Latchem  
Purch Agt: V W Peterson  
**TRAIL CREEK MINE**, Au  
50-TON PLOT MILL  
Under devel

**SAN GABRIEL VALLEY PLACERS**

1237 S Greenwood Ave, Montebello  
Own: Robert A Riggs  
MINE, 2 mi W of Azusa, placer, Au, Ag  
**GRAV MILL**

**SCHEIDLER MINING CO**

Box 32, Big Pine  
WO<sub>3</sub>  
Idle

**SCIOPINETTI, LOUIS**

Box 637, Hollister  
**JUNIPER MINE**, Paicines, undergr., Hg  
**DAR MINE**, San Benito City, surface, Hg

**SEVEN DEVILS MNG CO**

1121 E Seventh St, Long Beach  
Pres & Gen Mgr: Curtis Wood  
VP & Ass't Gen Mgr: L A Darland  
Sec-Treas: Curtis T Vondy  
(See Idaho)

**SHADOW MT MINES**

c/o Paul McHenry, Milton  
MINE, San Bernardino City, Ag, Pb  
Idle

**SHAMROCK MNG CO**

c/o George Topliff, 241 Jones St, San Francisco  
**SHAMROCK MINE**, Sonoma City, Hg  
Idle

**SHASTA MINERALS & CHEM CO**

612 Dooly Bldg, Salt Lake City 1  
Pres: K L Shoker  
VP: Harper Husemeyer  
Sec-Treas: Reed L Reeve  
Ass't Sec-Treas & Trf Agt: Nancy C Hardman

**WEST SHASTA COPPER ZINC DUST MINE** (Shasta-Philco Dodge, Joint Venture) Box 187, Redding, Ca, Za, S, Fe, Au, Ag  
Gen Mgr: Walter C Lawson  
Ass't Gen Mgr: E E Mallott  
Mine Gen Sup't: W J Walker, Geol  
Mine Engr: Roger Patrick

**SHERMAN PEAK MNG CO**

Box 589, Kernville  
**SHERMAN PEAK & HILLTOP MINES**, Tularcayo, undergr., surface, WO<sub>3</sub>  
50-TON GRAV MILL  
Idle

**H A SHIFFER ASSOCIATES**

3105 Pasadena Ave, Los Angeles 11  
Pres: Dr H A Shiffer  
VP: H Beckelman  
Gen Mgr & Sup't: J H Stepp  
Purch Agt: W Werneck  
Chief Eng: Dr Clarence A Lamb  
**VIRGINIA-POSO MINE**, Poso Creek, Pine Mt Mng dist, Kern County, placer, black sand, Ch, Ti, Zr, Au  
Geol: H A Shiffer, Jim Stark  
Met: Harold Ellis  
Idle  
**PLOT MILL**, at mine

**SHOOTING STAR TUNGSTEN MINE**

1124 W 2nd St, San Bernardino  
MINE, undergr., WO<sub>3</sub>, Ag, Au  
Idle

**SISKON CORP**

Box 148, Happy Camp  
Pres & Gen Mgr: H B Chesser, Sr  
VP: E J Schrader

**Sec-Treas: J E Chesser**

**SIEKON MINE**, Happy Camp, 41 mi SW of Happy Camp, open pit, Au, Ag  
Prod: 150 tons  
200-TON MILL, at mine  
Mill Sup't: A L McFarland  
Mill Frm: Ralph Moody  
(See Aris, Calif)

**SONOMA QUICKSILVER MINES, INC**

Box 236, Guerneville  
Pres: S R Smith  
VP: H L Hotle  
Sec-Treas: J W Cook  
**SONOMA QUICKSILVER MINE (MT JACKSON MINE)**, Box 236, Guerneville, undergr., Hg  
Gen Mgr: C M Schueler  
Gen Sup't: Herbert F Larsen  
Mine Sup't: Douglas Myers  
Mechanic: J L Galli  
Prod: 50 tons  
100-TON MILL, at mine, rotary furnace & condensers

**SOUTHWEST OIL CO**

568 Sunset St, Coalinga  
**BUTLER ESTATE #1 MINE**, Fresno City, 29 mi NW of Coalinga, open pit, Cr

**SOUTHERN CALIFORNIA MINERALS CO**

320 So Mission Rd, Los Angeles  
Own: W K Skeoch  
Geol: Charles F Joy  
Purch Agt: Dan Tash  
**DEATH VALLEY AREA TALC MINES**, Shoshone, talc  
Mine Sup't: Ben Gomes  
75-TON AIR FLOAT MILL, Los Angeles  
Mill Sup't: Glen Hodges

**SOUTHERN CROSS MINE**

Box 178, Columbia  
Gen Mgr: Charles M Bryan  
Own: Grant, Bryan & Foster  
MINE, 14 mi NW of Columbia, undergr., Au  
Idle

**SPANISH MINE**

100 Palm Ave, San Rafael  
Own: Louis R Moretti  
MINE, Nevada City, surface, baryte  
Prod: 30 tons  
150-TON MILL, Florin  
Mill Sup't: Forrest Photon

**SPULDING, L B**

Box 15, Ramona  
**METAL MT MINE**, 20 mi NW of Jacumba, undergr., WO<sub>3</sub>  
**LITTLE THREE MINE**, Ramona, Pyromalite minerals

**SULPHUR MNG & SUPPLY CO**

1991 East Glenoaks Blvd, Glendale  
Pres: Grover Kihorn  
Mine, Inyo County, S  
Idle

**SUN VALLEY TUNGSTEN CO**

11370 Pendleton St, Sun Valley  
**CUSTOM MILL**, Los Angeles City, WO<sub>3</sub>  
Idle

**SUNSET MNG CO**

213 Minna St, San Francisco  
Pres: J L Biacchetti  
VP: W O Kay  
Sec: Charles Greenberg  
(See Aris)

**SURCEASE MNG CO**

214 - 30th St, Sacramento  
Pres: A M Hoefting  
Sec-Treas: J B Gee  
**ATOLIA MINES**, Red Mountain, 3 mi SE of Randsburg, surface, undergr., WO<sub>3</sub>  
Gen Sup't: Silas J Guy  
Geol: Dion L Gardner  
Master Mech: Silas Guy  
100-TON PLOT MILL  
50-TON GRAV MILL  
Idle

**SWEENEY TUNGSTEN CO, LTD**

Box 185, Indio  
Gen Mgr: E G Sweeney  
Ass't Mgr: Elmer Tubbs  
Gen Sup't: Dale Ervin  
Geol: L Cornejo

**PINTO BASIN LODE, Chuckawalla**

dist, Au, Ag, WO<sub>3</sub>  
**RAINBOW MINE**, 30 mi E of Indio, surface, scheelite, FeWO<sub>4</sub>, Au, Ag  
Idle

**TAYLOR - KNAPP CO, THE CALIF DIV**

640 Moraga St, San Francisco 22  
Pres: S R Knapp  
VP: A V Taylor, Jr & C P Knapp  
Sec: A C Kremer  
Ch Eng: C P Knapp

**TEX YOUNG MINES**

Box 101, San Mateo  
**TEX YOUNG MINE**, Lake City, Mn  
Idle

**THOMAS, WALTER**

Box 100, Big Pine  
**TIP TOP MINE**, Inyo City, WO<sub>3</sub>  
Idle

**THUNDERBIRD MINES DEVEL CO**

21 Marcela Ave, San Francisco 16  
Pres & Gen Mgr: Perry L Jones  
**CLIMAX MINE**, Chico, open pit, Cu, Ag, Au, WO<sub>3</sub>  
Ass't Gen Mgr: V E Jones  
Gen Sup't: L L Jones  
Under devel  
**SILICON KING**, open pit, SiO<sub>2</sub>  
Under devel  
**ANTELOPE MINE**, Cu, Ag, Au, Mo, W, Fe  
Under devel

**TIGHTNER MINES CO**

Rm 549, 58 Sutter St, San Fran- cisco

Pres: Robert E McCulloch  
VP: W T Jenkins  
Sec: Carl S Morbie  
Treas: J Malcolm Vishal  
RED STAR GROUP, 1/2 mi N of Alleghany, undergr., Au, Ag  
Under devel  
50-TON GRAV MILL  
(Leased to Endurance Mining Co)

**TOTLAND BROS**

Box 341, Leevining  
Gen Mgr: G H Totland  
**BARBARA & BIG MUGETT MINES**, 12 mi NE of Leevining, Au, Ag, Pb  
**BRIGHT STAR MINE**, 8 mi W of Conway, undergr., Au, Ag, Pb, Bi  
Under devel

**TOYON MINE CO**

c/o Alvin M Bentley, Rte 1, Box 156 Calistoga  
**TOYON MINE**, Napa City, Hg  
Under devel

**TREG MNG & MLG CO**

Box 360, China Lake  
Pres: C L Green  
VP: & Purch Agt: R E Ralston  
Sec-Treas: W H Thorpe  
**BILLIE BURKE MINE**, Randsburg, undergr., scheelite  
**PIONEER MINE**, Johannesburg, undergr., Au  
25-TON GRAV MILL, Randsburg

**TRI-PARTNER MINING CO**

831 E Main St, Stockton  
Pres: Clifford Finley  
Sec-Treas & Gen Mgr: LeRoy A Washburn  
**SUNNY PLACER MINE**, Buena Vista, placer, Zr, Ti, Au  
**WONDER-QUARTZ MINE**, Groveland, undergr., Mn  
Gen Mgr: LeRoy A Washburn  
Ass't Gen Mgr: Clifford Finley  
Frmt: Edmund Walters

**TULARE BROS**

211 Jerome Prairie Rd, Grizzly Pass, Ore  
Own: Eugene R Brown, Beatrice Brown, Wanda Elliott  
Sept: L V Tufts  
**HIGH PLATEAU MINE**, Box 23, O'Brien, Ore, 30 mi W of O'Brien  
undergr., Cr<sub>2</sub>O<sub>3</sub>  
Idle

**TULARE CO TUNGSTEN MINES**

885 Lafayette Ave, Lindsay  
Own: Dominic F Lavacella & Sal Nacoli, Jr  
**BIG JIM MINE**, 18 mi NE of Lindsay, undergr., WO<sub>3</sub>  
Prod: 50 tons  
100-TON GRAV MILL, at mine  
Idle

## Colorado

**TURTLE MOUNTAIN MNG CO**  
P O Box 547, Karp  
Part: A O Birch, Robert B Landrum, Jr  
B G Van Horn  
Gen Mgr: R G Van Horn  
Met: L A Cornejo  
Elec Eng: E E Clark, Jr  
**VIRGINIA MAY MINE**, 10 mi W of  
Vidalia Junction, undergr., Cu, Ag, Au  
Eng: L A Cornejo  
Idle  
**NABBIT LEASE**, 9 mi W of Cross  
Roads, undergr., Mn  
Act Mine Frmr: Carl Nabbitt  
Mine Eng: L A Cornejo  
75-TON MILL

**TWINING LABORATORIES**  
2527 Fresno St., Fresno  
Own: Fred Twining  
**PLOT, MAGNETIC SEPARATION**,  
prod-scale assaying  
Met: Alex Vitav

**TYSON MNG CO**  
Box 172, Smith River  
MT VIEW MINE, Del Norte County,  
Cr

**UBEHEBE LEAD MINES, INC**  
510 Spring St., Los Angeles 13  
Pres: Grant Snyder  
VP: E S Alexander  
Sec: Allen Rankin  
**UBEHEBE MINE**, Death Valley, 50  
mi NE of Keeler, undergr., Pb, Zn,  
Ag, Au  
Leased

**UNDERWOOD, H V & PRICE**  
M 2  
156 Locust Ave., Hollister  
**ANTELOPE COPPER MINE**, 33 mi  
SE of Hollister, undergr., Cu  
Mills, at mine  
Idle

**UNDERWOOD, HORACE V**  
156 Locust Ave., Hollister  
**BITTER WATER QUICKSILVER**  
MINE, Panache dist., SE of  
Hollister, Hg  
Idle

**UNION CARBIDE NUCLEAR**  
CO, (DIV OF UNION CAR-  
BIDE CORP)  
Bishop  
**PINE CREEK MINE**, 27 mi NW of  
Bishop, undergr., surface,  $WO_3$ , Mo  
Gen Mgr: H L McKinley  
Purch Agt: C A Smith  
Mine Sup: L A Wright  
Mine Frmr: E J Birch  
Eng: D J Markt  
1,000-TON PLOT MILL, Pine Creek  
Sup: L E Sausa  
Plant Met: J E Martinson  
Mill Frmr: G H Rouse  
(See Colo., NY, Utah)

**UNITED MERCURY PRODUC-**  
ERS ASSOC  
16 Aliso Way, Menlo Park  
**OLD ALMADEN PROP**, Santa Clara  
County, undergr & open pit, Hg  
RETORET

**U S BORAX AND CHEMICAL**  
CORP, PACIFIC COAST  
**BORAX DIV**  
630 Shatto Place, Los Angeles 5  
Pres: J M Gerstley  
VP: P J O'Brien  
Purch Agt: J C Walker  
Sec: W A Ackerman  
Asst Gen Mgr: R F Steel  
**MINE**, Boron, open pit, borate ores  
Gen Sup: W J Diffley  
Safety Eng: L F Clegg  
Mine Sup: W H Wamsley  
Asst Mine Sup: P A Conte  
Frm: F M Smith  
Eng: G T Olen  
**BORON REFINERY**  
Refin Sup: J T Young  
Asst Sup: E D Lemon  
(See N Mex, NY)

**U S GYPSUM CO**  
300 W Adams St., Chicago 6, Ill  
**OPEN QUARRY**, Midland, gypsum  
Works Mgr: K Hepler  
**OPEN QUARRY**, Plaster City, gypsum  
Works Mgr: R W Deneker  
(See Colo., Conn, Ill, Ind, Iowa, Mass,  
Mich, Mont, Nev, N Mex, NY, Ohio,  
Okla, Tex, Utah, Va)

**U S LIME PRODUCTS CORP**  
2244 Beverly Blvd., Los Angeles 57  
Pres: L J Harvey, Jr  
Exec VP: Kennedy Ellsworth  
Res Mgr: Nevada: J C MacDonald  
Res Mgr, Tuolumne County, Calif:  
W W McCandlish  
Sup: Sloan, Nevada: Geo Rodriguez  
Sup: Apex, Nevada: C R Prince  
Sup: Henderson, Nevada:  
W H Mainor  
Sup: Nelson, Arizona: James Curless  
Purch Agt: E B Long  
**SONORA PLANT**, Tuolumne County,  
undergr  
(See Ariz, Nev)

**U S PUMICE SUPPLY CO, INC**  
6331 Hollywood Blvd.,  
Los Angeles 28

Pres: Sheldon P Fay  
VR: L B Clark  
Sec: Leona Steinbauer  
Treas: George H Lindsey  
Purch Agt: Wm C Wells  
**LEE VINTING MINE & MILL**, Lee  
Vining, surface, pumice stone  
Mine Sup: D H Campbell  
**GLASS MTH MINE & MILL**, Tulelake,  
surface, pumice stone  
Mine Sup: Robert E Maggard

**U S STEEL CORP**  
**COLUMBIA - GENEVA DIV**  
120 Montgomery St., San Francisco  
(See Alaska, Ala, Minn, Pa, Tenn,  
Utah, Wyo)

**UPPER PARADISE MINES**  
ASSOC, INC

P O Box 713, Barstow  
Pres & Gen Mgr: H A Shaffer  
VP: F T Leonetti  
Sec: J Wyness  
Purch Agt: Walter Wernecke  
**VERONICA MINE**, San Bernardino/  
County, open pit, undergr.,  $WO_3$ ,  
rare earths  
Mine Sup: L Clano  
Geol: H A Shaffer  
Met: Harold Ellis  
Idle

**UTAH CONSTR CO**  
(MINE OPERATORS & CONTR)  
1 Montgomery St., San Francisco

**VERDI DEVEL CO**  
2023 Hyperion Ave., Los Angeles 27  
Pres: Mitchell G Kovaleski  
VP: Edward Marziano  
Sec: Wendell Busch  
Dir: Hiram Lewis  
Treas: Wm Puharich  
**ROSAMOND URANIUM MINE**,  
Rosamond,  $U_3O_8$   
75-TON MILL, Mojave

**VICTORVILLE LIME ROCK**  
CO

Box 548, Victorville  
Pres: L K Ayers  
Sec-Treas: E A Piercy  
**VICTOR QUARRY**, open pit, limestone  
Gen Mgr: E A Piercy  
Gen Sup: Email Doty  
Geol: Robert Gesner  
Mech Eng: George Stone  
700-TON MILL, Victorville  
Mill Sup: Emmett Hall  
Asst Mill Sup: Perry Whittall  
Mill Frmr: Harold Hoechke

**VOLK, H L**  
Oakdale  
**JUNIPER MINE**, 44 Lambeth Ave.,  
Tuolumne Co.,  $U_3O_8$   
Under devel

**WAH CHANG MNG CORP**  
137 Clarke St, Bishop  
Gen Mgr: J J Strutzel, Jr  
Asst Gen Mgr: Gee Reed  
Purch Agt: Wm F Spain  
Geol: Byron W Works, Doug McIver  
Met: Phil McGuire  
Gen Sup: Bob Holmes  
**BLACK ROCK MINE, BENTON DIV.**,  
undergr.,  $WO_3$   
Mine Sup: Ned Fillip  
Prod: 600 tons  
**GRAV-PLOT MILL**  
Mill Sup: Fred Yarcho  
Idle  
(See Colo, Nev, & E A Schols & J H  
Cazier, Ariz)

**WALKENG MINING CO**

Box 126, Taylorsville  
Pres: Ray W Blaser  
VP & Gen Mgr: Aiden H Hughes  
Sec: Edson Able  
**MINE**, 25 mi N of Taylorsville,  
undergr., Au, Cu, Ag  
Under devel

**WARNKEN, LOUIS JR**  
Box 37, Lone Pine  
**DURHAM, ST CHARLES FERNANDO**  
& ALAMEDA GROUP, Inyo County,  
Wd, Idle

**WATKINS, J H**  
Scott Bar  
**LADY GREY MINE**, Scott Bar,  
undergr.,  $Cr_2O_3$   
Prod: 10 tons  
**63-TON GRAV MILL**, Scott Bar  
Under devel

**WEBB, DAVID L**  
O'Brien, Oregon  
**WEBB MINE**, Del Norte County, Hg  
Idle

**WEST COAST CHROME**  
PRODUCERS  
Box 324, Coalings  
Own: Jack James & Andrew Thickstan.  
Oper: J R Holmon  
**MINE**, 36 ft NW of Coalings  
Idle

**WESTERN BARIUM CORP**  
110 Sutter St., San Francisco 4  
Pres: A Gorman  
VP-Sec: A W Gorman  
**BARITE KING** Bl, 2, 3, 4, 5, 6  
surface, barites  
(Leased to Macco Corp)  
**MILL**, Rosamond  
Prod Mgr: James D Hawkins

**WESTERN DEVEL CO**  
P O Box 1084, Blythe  
Part: R S Hall & Maurice Willows, Jr  
**MINE**, 18 1/2 mi NW of Blythe,  
open pit  
Idle

**WESTERN REFRACTORIES**  
CO

Box 169, Lone  
Pres: A C Gladding  
VP: A L Gladding  
Gen Mgr & Sec: O M Tupper, Jr  
Gen Sup: N W Ensley  
**WESTERN TALC MINE**, 14 mi SE  
of Tecopa, undergr, talc, fire clay  
Mine Sup: Marcus Sager  
Ceramic Engr: Eiven Knutson  
**MILL**  
Sup: Los Angeles, F C Frey  
Sup: Dunn: A T Krebs

**WESTERN TALC CO**  
180 E Slauson Ave., Los Angeles  
Pres: F H Savel, Sr  
VP: Malcolm Stewart  
**WESTERN MINES**, operating on Snow  
Goose claim, 17 mi SE of Tecopa,  
San Bernardino County, talc  
Mine Sup: Marcus Sager  
Mills, Los Angeles and Dunn,  
San Bernardino County  
Capacity: 150 tons per day average

**WHISKEY HILL MINE**  
Whiskey Town  
MINE, Shasta County, undergr., Au  
Idle

**WHITE & RAY**  
Box 54, Orleans  
**PEARCH MINE**, Humboldt County,  
placer  
Idle

**WILLOW VALLEY MINES**  
CALIF, INC

461 Market St., San Francisco  
Pres: Lee G McCoy  
VP: Lowell B Hoff  
Sec-Treas: George V Pettigrew  
Purch Agt: L Manson  
**WILLOW VALLEY MINES**, Nevada  
City, undergr., Au, Ag,  $WO_3$   
Geol: J F Siegfried  
Prod: 75 tons  
**MILL**, Nevadas City  
Sup: Ed O Berger  
Asst Sup: G E Hiller

**WIND WHEEL MINE**  
Box 151, Columbia  
Own: R O Greaves  
**MINE**, undergr., Au, Ag  
3 1/2-TON GRAV MILL, at mine  
RETORET SMELTER, at mine

**WYOMING GULF SULPHUR CO**  
Cody, Wyo  
**MIRACLE MNG CO PROP**, near  
Bakersfield,  $U_3O_8$   
Under devel

**YELLOW JACKET CONS**  
GOLD MINES

120 Chester Ave., Bakersfield  
Pres: Clifford Dickhut  
VP: A F Bullard  
Sec: James Ebert  
Gen Sup: C J Ayres  
Geol: B C Austin  
**MINES**, Alleghany, undergr, Au, Ag

**YRACABEL, V**  
Box 17, Middletown  
**JAMES CREEK MINE**, E Mayacmas  
Dist, Napa Co, Hg

**YUBA CONS INDUSTRIES,**  
INC

**YUBA CONS GOLD FIELDS DIV**  
331 California St., San Francisco 4  
Pres: John L McGara  
VP, Mgr: C H Brittenham  
Sec: E J Gorman  
Treas: Carter P Thacher  
**MINE**, Hammonton, Yuba City,  
placer, Au, Sn  
Gen Mgr: Clarence C Carlson  
Asst Gen Mgr: J J Theisison  
Geol: Leslie Gasaway  
Mine Sup: Cecil Brophy

**YUKOH TUNGSTEN MNG CO**  
Box 39, Dunlap  
Pres & Gen Mgr: R W Burge  
**THAWEEK MINE**, WO<sub>3</sub>  
Mgr: S H Strickland  
35-TON MILL  
Idle

## COLORADO

**ACME URANIUM MINES, INC**  
404 First Nat'l Bank Bldg, Denver

Pres: J L Beaudin  
VP: H W Sibley  
Sec-Treas: E O' Bannon  
**GOOD HOPE, NEVADA, ATOM MINES**,  
undergr.,  $U_3O_8$ ,  $U_3O_8$   
Prod: 50 tons  
Gen Mgr: John Obrecht  
Mine Frmr: Glen Chittenden  
**CHATQUA MINE**, Montezuma,  
undergr., Pb, Ag, Zn, As  
Idle

Mine Frmr: Leo Miller  
65-TON LEAD PLOT MILL,  
Montezuma  
Mill Sup: W R Clark

**AJAX MNG & OIL CO**  
Box 1075, Grand Junction  
Pres: R F Gilmore  
Sec-Treas: J R Cagle  
**AJAX & LUCKY DAY CAVE MINES**,  
6 mi SW of Gateway, undergr., U V  
(Leased to Climax Uranium Co)

**AJAX URANIUM CORP**  
1154 Bannock St., Denver 4  
Pres: T J Weaver  
VP: Paul McWilliams  
Sec-Treas: Frances K Waggener  
73 CLAIMS, San Miguel Co.,  $U_3O_8$   
Geol: T J Weaver  
Under devel

**ALEXANDER, EARL & LINNIE**  
Box 33, Ouray  
**LOST DAY, PATSY, & HELEN MINES**,  
Ouray, Ag, Pb, Zn

**ALLEN URANIUM EXPLOR**  
Golden  
SUCCESS GROUP, Gilpin County,  
Ag, Pb, Zn

**ALLIED CHEM & DYE CORP.**  
GEN CHEM DIV  
Box 228, Boulder  
Mgr, Min Oper: Robert H Dickson  
Asst Mgr, Min Oper: Wilbert J Treppe

**JAMESTOWN MINES**, 20 mi NW  
of Boulder, undergr.,  $CaF_2$   
Prod: 125 tons  
Sup: James R Pennington  
Mine Frmr: Jack Mann  
Master Mech: A W McGowen  
100-TON MILL  
Mill Frmr: T J Hinshaw  
(See N Mex, Mo, NY, Va)

**ALTA URANIUM INC**  
10th & Grand, Grand Junction  
Pres: R E Dorwart  
VP: Tom Castro  
Sec: O Taylor  
Treas: O R Simpson  
(See Ariz)

**MINING WORLD**

**ALTAMONT MNG CO**  
50 E 10th St, Bountiful, Utah  
Gen Mgr: Geo Schultz  
MINE, near Gunnison, U<sub>3</sub>O<sub>8</sub>  
Under devel

**ALTA VISTA URANIUM & OIL CO**  
976 Main St, Durango  
U<sub>3</sub>O<sub>8</sub> Prod  
Under devel

**AMBASSADOR OIL CORP**  
Box 9338, 3101 Winthrop Ave,  
Fort Worth, Texas  
**MINERAL PARK #4 MINE**, 808 Road  
Ave, Box 413, Grand Junction,  
undergr., U<sub>3</sub>O<sub>8</sub>, V  
Eng: Francis X Corbett  
(See Texas)

**AMERICAN GILSONITE CO**  
134 W Broadway, Salt Lake City,  
Utah  
Pres: E F Goodner  
VP: R E Nelson  
Sec-Treas: E H Owen  
Asst Prod Mgr: John M Baker  
**COKE PLANT-REFINERY**, Gilsonite  
Supt: J L Boyce  
Mgr: L P Morris  
(See Utah)

**AMERICAN LEDUC URANIUM**  
200 N 4th, Grand Junction  
**HENDERSON #1 MINING/ECONOMY**  
CLAIMS, Outlaw Mesa area,  
Mesa County, U<sub>3</sub>O<sub>8</sub>  
**PROPERTIES**, Moffat County, U<sub>3</sub>O<sub>8</sub>  
(See Utah)

**AMERICAN METAL CLIMAX;**  
INC.  
61 Broadway, New York 6, N Y  
Chmn of Bd: Arthur H Bunker  
Pres: Hans A Vogelstein  
Sec: Erwin A Weil  
Treas: Donald J Donahue  
**CLIMAX MOLYBDENUM CO DIV.**  
VP, Western Oper: Frank Coolbaugh,  
Mines Park, Golden  
Dir of Explor: John Curson, Mines  
Park, Golden  
Met: R E Cuthbertson, Mines Park,  
Golden  
**CLIMAX OPERATIONS**, Climax  
Res Mgr: Robert Henderson  
Gen Sec: Edwin J Eisenach  
Asst Gen Sup: John Petty  
Genl: Stewart Wallace  
Eng: Urban Toucher  
Ind Rel Dir: R C Miller  
Planning & Devel Eng: Max Galvin  
MINE, undergr., Mo<sub>2</sub>, W<sub>3</sub>O<sub>8</sub>, Fe<sub>2</sub>O<sub>3</sub>, S  
Mine Supt: William Distler  
Asst Mine Supt: Joffre Johnson,  
Charles Cleaves  
Mine Frm: Tom Phillips, Bill Nelson  
Prod: 34,000 tpd

**AMERICAN SMELTING & REFINING CO**  
803 First Nat'l Bank Bldg,  
Denver 2  
Mgr: J Paul Harrison  
**ARKANSAS VALLEY PLANT**, Pb  
Box 973, Leadville  
Supt: T P Fahey  
Asst Supt: L C Travis  
Metallurgists: M D Rood, R Enochs,  
P A De Santa, Q Coheur  
Wm Sweat  
Master Mech: C Hopfinger  
Chief Acct: Edward J Kelly  
Safety Eng: Frank Stevens  
Plant Eng: R L Armbruster  
Ch Assayer: R J Elliott  
Ch Chem: Max Kasten  
**GLOBE PLANT**, Denver, Cd  
Supt: W L Miles, Jr  
Asst Supt: Max Coates  
Safety Insp: J Ryan  
**LEADVILLE MNG DEPT**  
Mine Supt: A Haessler  
IBEX-SUNDAY, ECLIPSE-IRENE,  
FRIER HILL & ROBERT EMMETT  
OPNS, Za, Pb, Au, Ag  
Mds  
(See Ariz, Calif, Idaho, Ill, Kans,  
Md, Mont, Nebr, N J, N Mex, N Y  
Tx, Utah, Wash, & Federal Mng  
& Smelting Co, Mo)

**AMPET CORP.**  
Colorado Bldg, Denver  
Pres: R A Gus Davis  
Sec-Treas: Alfred O Brehmer  
MINE, San Miguel County  
U<sub>3</sub>O<sub>8</sub> Prod  
(See Arizona, Utah)

**ANDREWS, CLYDE & ASSOC**  
Placerville  
**PATROCK MINE**, Mesa County, U V

**ANDREWS, K M & D K**  
Box 87, Nucla  
**BADGER MINE**, undergr., U<sub>3</sub>O<sub>8</sub>,  
V<sub>2</sub>O<sub>5</sub>  
**JUPITER MINE**, Gunnison County,  
U<sub>3</sub>O<sub>8</sub>, Cu  
Under devel

**ANNA C MNG CO**  
c/o Old B Scott, Rye  
**ANNA C MINE**, Boulder County,  
WO<sub>3</sub>  
idle

**ANSHUTZ DRILLING CO, INC**  
1411 Mile High Center Bldg, Denver  
Pres: Fred A Anschutz  
VP: J H Casier  
Sec: G Michael Morris  
Geol: Louis Gas, W B Lyons  
**AMERICAN EAGLE MINE**, Gypsum  
Valley, undergr., open pit, U<sub>3</sub>O<sub>8</sub>  
Prot: 30 tons  
(See Wyo)

**ARBOGAST, H L**  
Rt 4, Grand Junction  
U<sub>3</sub>O<sub>8</sub> Prod

**ARGO MNG CO**  
P O Box 1698, Grand Junction  
Managing Part: Lyle F Campbell  
**LOST DUTCHMAN MINE**, Beaver  
Mesa County, undergr., U<sub>3</sub>O<sub>8</sub>,  
V<sub>2</sub>O<sub>5</sub>  
Mine Frm: John Honstein

**ARYCLE MNG & MLG CO**  
670 Pearl St, Denver  
**MINES**, San Juan Cty, Au, Ag, Cu,  
Pb, Zn  
Under devel

**ATLAS MINING & MILL CORP**

Box 207, Grand Junction  
Pres: Alan A Fisher  
VP: Frank Fleming  
Sec-Treas & Purch Agt: Warren  
Bassham  
**HAWKEYE MINE**, Crested Butte,  
undergr., Au, Ag, Pb, Zn, Cu  
Gen Mgr: Warren Bassham  
Geol: Raymond C Robeck  
idle  
75-TON FLOT MILL

**ATOMIC FUEL EXTRACTION CORP**  
Bedrock  
Pres: J C Turner  
VP: L M Buhler  
Sec: John R Black  
**URANIUM MILL**, Bedrock, Montrose  
County  
(ACM has authorized mill contract)  
idle

**AURORA URANIUM CO**  
317 Main St, Grand Junction  
**LITTLE JONNIE MINE**, Mesa  
County, U V

**AUSMUS & HIGHTOWER**  
Naturita  
U<sub>3</sub>O<sub>8</sub> Prod

**AUSMUS & STAATS**  
Naturita  
U<sub>3</sub>O<sub>8</sub> Prod

**B&B MNG CO**  
Albuquerque, N Mex  
U<sub>3</sub>O<sub>8</sub> Prod

**BACHELOR MINE**  
c/o Carl I Dismant, 3037 Birch  
St, Denver 7  
MINE, near 4 Mine, Ouray, undergr.,  
Pb, Ag, Zn, Au, Cu  
idle

**BALBOA MNG & DEVEL CO**  
P O Box 861, Grand Junction  
Pres: William M Spencer, Jr  
VP: Albert F Stock  
Sec-Treas: Laurence G Duerig

**BALD EAGLE MNG CO**  
Travel Center Bldg, 1640 Court Pl,  
Denver  
(A joint venture between Jackpot Oil  
Co and Hafen Leavitt)

**BALD EAGLE MINE**, Idaho Springs,  
undergr., Au, Pb, Ag, Cu, Zn  
Gen Mgr: R Gerald Hughes, Hafen  
Leavitt  
Mine Supt: I D Crawford  
Mine Eng: John H McElroy  
Prod: 85 tons  
125-TON FLOT MILL, at mine  
Mill Supt: Charles Quinn  
SMELTER, Leadville

**BARD CREEK MINE**  
Empire  
Own: A F Mayham  
MINE, near Empire, Au, Ag, Pb, Zn  
Under devel

**BARKER, DELBERT W**  
P O Box 263, Nucla  
U<sub>3</sub>O<sub>8</sub> Prod

**BARKLEY AND CO, INC**  
Box 8, Cripple Creek  
Pres: A C Denman  
VP: George F Stiner  
Treas: Eugene Beagles  
**AEC RESERVE BLOCK 6 MINE**,  
Box 554, Uravan, undergr., U<sub>3</sub>O<sub>8</sub>,  
V<sub>2</sub>O<sub>5</sub>  
Grol: Elmer E Reinhards  
Mine Supt: Troy E Wade  
Mine Frm: M K Doyle  
Prod: 5 tons

**BARTON URANIUM CO**  
304 Uranium Center Bldg, Grand  
Junction  
Pres: S W Barton  
Sec: Olive H Roy  
**PAY DAY GROUP**, Uravan, 12 mi W  
of Uravan, U<sub>3</sub>O<sub>8</sub>, V  
Supt: Wm Doertenbach  
Geol: J M Harlan

**BEAVER MESA URANIUM INC**

P O Box 587, Grand Junction  
Pres: Alan M Simpson  
VP: Julian M Simpson  
Sec-Treas: Mark Holloway  
**RAJAH-CHEROKEE-PACKRAT**,  
Gateway mng dist, undergr., U<sub>3</sub>O<sub>8</sub>,  
V<sub>2</sub>O<sub>5</sub>  
Gen Mgr: Alan M Simpson  
Mine Supt: Vernon Lehr, Henry Lehr  
Asst Mine Supt: Frank Gray Seal  
Prod: 200 tons

**BEE - SHO - SHEE MNG CO**  
c/o George Newell, Fruta  
idle

**BENHAM, RAYE**  
Dolores  
U<sub>3</sub>O<sub>8</sub> Prod  
idle

**BERTOCH, B H**  
P O Box 65, Engar  
U<sub>3</sub>O<sub>8</sub> Prod

**BERYLLIUM MNG CO, INC**

Box 278, Gunnison  
Pres: J R Wemlinger  
Gen Mgr: C A Wemlinger  
VP: E H Sheets  
Sec: J T Dickey  
**OHIO CITY MINE**, 22 mi from  
Gunnison, surface, beryl, mica,  
feldspar, tantalite, columbite  
Under devel

**BINDER, F V**  
Naturita  
U<sub>3</sub>O<sub>8</sub> Prod

**BISHOP CANYON URANIUM CORP**

Box 2016, Robbs, N Mex  
**HOGBACK MINE**, Dove Creek,  
undergr., U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Lessee: Bob Estes  
Prod: 5 tons  
(See N Mex)

**BLACK GIRL MINES CO**

281 Hollins St, Bakersfield, Calif  
Box "M", Ouray  
VP: J M McCadden  
**BLACK GIRL MINE**, Ouray, undergr.,  
Ag, Cu, Pb, Au  
**RED MT MINE**, Red Mt, undergr.,  
Ag, Cu, Pb, Au  
Gen Mgr: J M McCadden  
Geol: Dr C M Shaw  
idle

**BLACK MNG CO**

Silverton  
**SILVER LEDGE MINE**, San Juan  
County, Ag, Pb, Zn  
idle

**BLUE CREEK MNG CO**  
c/o Esther S Crane, P O Box 206,  
Aztec, N Mex

U<sub>3</sub>O<sub>8</sub> Prod

**BLUE RIDGE MINES**

c/o E L Groth, 1434 Filmore,  
Denver  
**BLUE RIDGE MINE**, Clear Creek  
County, Au, Ag  
idle

**BONITA MNG & DEV CO**

Box 186, Silverton  
Pres: F C Brightly, Jr  
Gen Mgr: H P Ehrlinger  
Sec: V O Ring  
**LEAD CARBONATE MINE**, 11 mi  
NE of Silverton, undergr., Au, Pb, Zn  
Pb, Ag, Cu  
**PRIDE OF BONITA MINE**, 11 mi  
N of Silverton, undergr., Pb, Ag, Zn  
**EMMA-OREGON GALENA GROUP**,  
San Juan County, Zn, Pb, Ag  
Under devel  
**50-TON FLOT MILL**, Gladstone  
Supt: H P Ehrlinger  
idle

**BOREALIS MNG CO**

Aspen  
Pres: Alton Beck  
**MONTEZUMA MINE**, Pitkin County,  
Ag, Pb, Zn  
idle

**BRIDGER - JACK INC**

150 W Main St, Grand Junction  
Pres: Garth W Thornburg  
VP: O E Thornburg  
Sec: J E O'Connor  
Mie  
(See Utah)

**BRITISH WESTERN AMERICA URANIUM CORP**

821 1st Security Bank Bldg, Salt  
Lake City, Utah  
**GRIZZLEY MINE**, Georgetown,  
undergr., Pb, Au, Ag, Cu  
Gen Mgr: Robert A Subblefield  
Mine Supt: Tim Wade II  
Prod: 100 tons  
**110-TON FLOT MILL**, Georgetown  
Mill Supt: Charles Federhaf  
idle  
(See Utah)

**BROWN MINES**  
P O Box 243, Montrose  
U<sub>3</sub>O<sub>8</sub> Prod

**BUCKEYE MNG CO**  
123 Myrtle Pl, Cortez  
U<sub>3</sub>O<sub>8</sub> Prod

**BUCKSKIN JOE MINES, LTD**  
Alma  
Gen Mgr: C W Jordan  
**PHILLIPS MINE**, undergr., Au, Ag,  
Cu, Pb, Zn, Fe  
Under devel

**BUFFALO HEAD MNG CO**  
P O Box 964, Craig  
U<sub>3</sub>O<sub>8</sub> Prod  
Under devel

**BUNKER & CO**  
P O Box 183, Naturita  
U<sub>3</sub>O<sub>8</sub> Prod

**BURKE - MARTIN MINES, INC**  
901 Sherman, 1st flr, Denver 3,  
BURKE GROUP, Summit County,  
Ag, Pb, Zn

**BURNETTE, HUEY F**  
201 Uranium Center, Grand Junction  
**BURNETTE #5 MINE**, Long Park Area,  
Montrose County, undergr., U<sub>3</sub>O<sub>8</sub>,  
V<sub>2</sub>O<sub>5</sub>

Gen Mgr: Grand H Huntley  
Mine Supt: Paul P Paverion  
Prod: 30 tons  
(Leased from Vanadium Corp of Amer)

**BURRELL, DOROTHY M**  
Minister  
U<sub>3</sub>O<sub>8</sub> Prod

**CASH MINING CO**  
2512 W 9th Ave, Denver  
LAST CHANCE-GUNNISON CITY-feldspar

**CADWELL MNG CO**  
c/o Vernon L Phillips, 504 W 8th St,  
Leadville  
**HAYDEN SHAFT**, Ag, Pb, Zn  
idle

**CAMOOSE URANIUM MINES**  
P O Box 115, Grand Junction  
U<sub>3</sub>O<sub>8</sub> Prod

**CAMP BIRD LTD**  
70 Pine St, New York 5, N Y  
Chmn: John Daigleish  
Cons Eng: C Maxwell Norman  
Sec: Ian Whyte

**CAMP BIRD MINE**, Ouray, undergr.,  
Ag, Zn, Cu, Au, Ag  
idle

**CAMP BIRD LTD**  
70 Pine St, New York 5, N Y  
Chmn: John Daigleish  
Cons Eng: C Maxwell Norman  
Sec: Ian Whyte

**CAMP BIRD MINE**, Ouray, undergr.,  
Ag, Zn, Cu, Au, Ag  
idle

**CAMP BIRD LTD**  
70 Pine St, New York 5, N Y  
Chmn: John Daigleish  
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**CAMP BIRD MINE**, Ouray, undergr.,  
Ag,

## Colorado

CANFIELD, ARTHUR  
P O Box 84, Dove Creek  
 $U_3O_8$  Prod

WM J CAREY MNG CO  
624 Rood Ave, Grand Junction  
Mgr: Harry E Hayes  
Dist Geol: Dow W Fieldman  
Explor  
(See Aris)

CARPENTER, MORRISON  
URANIUM & OIL CO  
P O Box 354, Moab, Utah  
 $U_3O_8$  Prod

CATARACT MNG CO  
(See San Juan Minn & Devol Co)

CENTRAL URANIUM & MLO  
CORP  
Box 277, Central City  
Gen Mgr: George C Richard  
MINES, Gilpin County, Au, Pb, Zn, Cu,  
 $Ag$ ,  $U_3O_8$   
Idle

CHAMPION MINES CO

941 Monroe St, Denver 8  
Pres: Jessie Simmons

Sec: J J Simmons

MORNING STAR & LAST CHANCE  
MINES

LEASES ON JERRY JOHNSON, WPH  
& FOREST QUEEN MINES,  
Cripple Creek, undergr, Au  
Idle

CHAVEZ, J A  
P O Box 418, Nederland  
BONANZA PLACER, 403  
Idle

CHEROKEE MINES

231 S Grant Ave, Ft Collins

Pres: T H Sackett

VP: V E Crum

Sec-Treas: Jas H Andrews

BLACK HAWK #1 & 2 MINES,

undergr,  $U_3O_8$

Gen Mgr: T H Sackett

Idle

CHEROKEE URANIUM MNG  
CORP

1507 Mile High Center, Denver

Pres: James S Henderson

MINES, Gilpin County, Au, Ag, Cu,

Pb, Zn,  $U_3O_8$

Idle

CHESAPEAKE & COLORADO  
CORP

909 16th St, NW, Washington, D.

C

135 S 4th St, P O Box 1228,

Grand Junction

Pres: Francis M Thompson

VP: Lytle Brown, Jr

Sec: Gillis W Long

Treas: Howard Riser

CALEDONIAN MINE, Silverton, Ag,

Pb, Zn

Gen Mgr: Lytle Brown, Jr

Gen Sup: Dutch Hildebrand

Idle

(See NC)

CINDERELLA URANIUM &

OIL, INC

900 McBurnett Blvd, San Angelo,

Texas

KING SOLOMON #1, c/o Spencer

Heights, Belvue, undergr,  $U_3O_8$

Gen Mgr: Marvin C Hamm

Geol: Mark A Eidelberg

Expl Eng: Nicholas H James

Field Super: Douglas A Williams

Min Sup: Holley H Knobels

(See Texas)

CLIMAX MOLYBDENUM CO

DIV (SEE AMERICAN METAL

CLIMAX, INC)

CLIMAX URANIUM CO, (SUBSIDIARY  
OF AMERICAN METAL CLIMAX  
INC)

Box 1900, Grand Junction

Pres: Frank Cobaugh, Mine Park,

Golden

VP & Gen Mgr: A M Mastovich

Purch Agt: L J Mann

Consult: E J Dugan

MINES, near Grand Junction, undergr,

$U_3O_8$ ,  $V_2O_5$

Gen Mgr: L J Dugan

Prod Sup: T E McCandless

Gen Eng: Andy Korn

Ch Geol: R J Wright

Geol: R P Darnell, P Donnerstag,

W A Roberts, R M Warner,

E D Bieber, R T Nakoda  
E T Anderson, J C Moore  
CHEM MILL, Grand Junction  
Mgr: R C Toepfer  
Ass Sup: Paul Wire  
Master Mach: G K Burnhart  
Ch Met: R E Musgrave  
Ch Chem: Q S Kocher  
Cle Aris, N Y, Utah  
34,000-TON FLOT MILL, at mine  
Mill Sup: Frank Windolph  
Ass Mill Sup: Fred Hoff  
(See NY, Pa)

CLYDE URANIUM MINES  
P O Box 58, Moab, Utah  
 $U_3O_8$  Prod

COCEHAM, W A  
3165 W Colorado, Colorado Springs  
VALLEY VIEW MINE, mica, feldspar  
Idie

COG MINERALS CORP  
Denver Club Bldg, Denver  
Pres: W C Norman  
VP: J H Nelson  
Treas: D F Taylor  
Purch Agt: Ed McDonald  
(See Utah)

COLD SPRING TUNGSTEN,  
INC  
1st Nat'l Bank Bldg, Denver 8  
Pres: Boris Pregel  
VP: Alexander Pregel  
Sec: Paul Newton  
COLD SPRING MINE, Nederland,  
undergr, WO  
Gen Mgr: Dr C Ridland  
Ass Gen Mgr: Chas H Turner  
Mine Sup: Sam D Walter  
Prod: 50 tons  
SO-TON GRAV MILL, Nederland  
Mill Sup: Wm R Nolan  
Idle

COLONIAL NUCLEAR  
INDUSTRIES, INC  
45 United States Bank Bldg,  
Grand Junction  
Pres: C W Schrader, R D Hughes,  
W Haselbeck  
Sec: O S Halvorson  
Treas: O M Duckett  
Idle

COLO AGGREGATES CO, INC  
Mesita  
Pres: Geo M Ordingolph  
VP: W W McClintock  
Sec-Treas: Henry Quiller  
MESITA HILL MINE, 3 mi N of  
Mesita, surface, volcanic scoria,  
Gen Mgr: Geo M Ordingolph  
Prod: Robert Compton  
Prod: 300 tons

COLO FUEL & IRON CORP  
Continental Oil Bldg, Denver  
Pres: A F Frans  
Sec: D C McGraw  
Treas: H C Crot  
MINING DEPT, Box 318, Pueblo  
VP, Oper: J J Martin  
Dir, Purch: L C Ross  
Mng: Mines: R R Williams, Jr  
Ch Eng: Mng Dept: H W Schmeler  
Ch Geol: D A Carter  
Ch Elec: J W Irwin, Trinidad  
MONARCH QUARRY, Limestone,  
Salida  
Sup: J E Whitney  
Prod: 2,000 tons  
CANON DOLOMITE QUARRY, Canon  
City  
Sup: E C Jagow  
Prod: 325 tons  
(See Utah, Who)

COLO GOLD KING MINES,  
INC  
Box 108, Silverton  
Pres & Gen Mgr: H P Ehrlinger  
VP: A D Miner  
Sec-Treas: V W Tooley  
GOLD KING MINE, undergr, Au, Ag  
Pb, Zn, Cu  
Idle

COLO TRI-STATE MNG CORP  
Denver  
Pres: G F Hardwick  
VP: A Kanekeberg  
Sec: J J Foley  
Treas: Walter Wilson  
MINE, open pit, Co<sub>2</sub>  
500-TON HEAV-MED MILL, Durango  
Idle

COMINCO COOPERATIVE MNG  
CO, LTD

Dove Creek  
Pres: H C Skeels  
VP-Sec-Treas: R L Schwendemann  
COMINCO COPPER MINES, Wet Mt  
Valley, Westcliffe, Co  
MINE, Slick Rock, U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Prod: 100 tons  
Gen Mgr: R L Schwendemann  
Mine Sup: H C Skeels  
Assist Mine Sup: R E Lehman  
Mine Pmn: Thomas L Duncan  
150-TON MILL & LEACHING PLANT,  
at copper mine

COMMERCIAL MNG, INC  
Box 303, Marshfield, Wis  
RESERVATION MINE (leased),  
undergr, U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Under devel  
(See Wisch)

CONGRESS MNG CORP  
400 Darling Bldg, Salt Lake City,  
Utah  
Pres: Leo G Meredith  
Sec-Treas: Karl F Buell  
CONGRESS MINE, Bull Canyon,  
Under devel

CONSOL GOLD - URANIUM  
CORP  
308 Columbine St, Denver 8  
Pres: R E Parker  
VP & Purch Agt: Ralph Bradley  
Sec-Treas: R L McCoy  
Gen Sup: C L Barker  
Mech Eng: H E Grosvenor  
Mine Sup: Leslie Barker  
TREASURE KEY TUNNEL, Blackhawk,  
undergr  
Under devel  
JOHNNY BULL, Silver Flame, undergr,  
Ag, Pb

CONTINENTAL MATERIALS  
CORP (FORMERLY CONTIN-  
ENTAL URANIUM, INC)  
820 S Ninth St, Grand Junction  
Pres: Willard Gidwitz  
Sec: Max H Braus  
Dir Chmn: Gerald Gidwitz  
Gen Sup: C H Reynolds  
Under devel  
(See Utah, Wyo & Woodmen, Inc, Utah)

COPELAND, THOS A &  
KNIGHT, JAMES A  
213 E 5th, Hindale, HI  
EL PASO GROUP, et al  
CRIPPLE CREEK, Teller County

CORONADO COPPER & ZINC  
CO  
439 1/2 Main St, Grand Junction  
Under devel

COSTELLO LEASE  
Bonanza Rd, Villa Grove  
Op: W J Costello  
RAWLEY MINE, Bonanza, 30 mi  
NW of Villa Grove, undergr, Pb,  
Zn, Ag, Cu  
Prod: 50 tons

COUCH & TRONE  
Naturita  
 $U_3O_8$  Prod

CRAZY GIRL MNG CO  
Idaho Springs  
CRAZY GIRL MINE, Ag, Pb, Zn

CRESCENT URANIUM MINES,  
INC  
Denver  
CRESCENT CLAIMS, Outlaw Mesa,  
Montrose County,  $U_3O_8$

CRESSION CONSOL GOLD MNG  
& MLO CO, THE  
Box 127, Cripple Creek  
Pres: Merrill E Shoup  
VP & Gen Mgr: Max W Bowen  
Sec: H Bates  
Sup: Wilbur Wassaw  
Mech Eng: Geo Lorenz  
Purch Agt: H L Stone  
MINE, 3 mi E of Cripple Creek,  
undergr, Au  
Mine Sup: A H Bebes, Jr  
Prod: 150 tons

CRIPPLE CREEK MNG &  
MLO CO  
Box 247, Cripple Creek  
Pres: Lyle Hagler  
Sec: John Adair  
Gen Mgr: Richard B Walls  
GOLD KING MINE, 1 mi from  
Cripple Creek, undergr, Au  
Idle  
(See Aris)

CROWN MNG CO  
125 N 8th, Grand Junction

CROWN URANIUM COMPANY  
Box 163, Casper, Wyo  
LOST BROTHERS MINE, Norwood,  
Bell Canyon Dist, surface,  $U_3O_8$   
TOM CATS MINE, Mineral Mtn,  
surface,  $U_3O_8$   
Gen Mgr: D B Wade  
Gen Sup: Ray Barron  
Under devel  
(See Utah, Wyo)

CRUSADER OIL & URANIUM  
CO  
1117 E Colfax Ave, Denver 18  
Pres: James F Macon

VP: Dwight H Elder  
Sec-Treas: H C Bartholomew  
Under devel

CULLEN MINERALS CORP  
610 Rood Ave, Grand Junction

Pres: Lucien H Culien  
VP: K D Kaasch  
Sec-Treas: T H Tucker  
(See Utah)

CUMBRES MNG CO, INC

Box 694, Alamosa  
Pres: Wigford W Myers  
VP: Richard Frink  
Sec: Pedro Vigil  
Treas: Browne Clark  
Gen Mgr: C O Roascher  
CLAIMS, Sangre de Cristo Range,  
N of Alamosa, rare minerals  
REDWING LEASES, near Redwing,  
U, V, cerium, rare earths  
Under devel

CYPRESS MINES CORP

439 1/2 Main St, Grand Junction  
URANIUM CLAIMS  
Under devel

(See Aris, calif)

D & J URANIUM & EXPLOR  
CO  
325 N Santa Fe, Pueblo

Pres: Russell L Jewell

VP: Frederick E. Jewell

Sec: Tom Harkness

Treas: Seaman & Jewell

Dir: Garrett Fonda

BONITA MINE, Pueblo, undergr,

$U_3O_8$

Mgr: S A Jewell

Asst Mgr: R L Jewell

Under devel

DALLAS URANIUM & OIL  
CORP

332 Mercantile Commerce, Dallas,  
Texas

$U_3O_8$  Prod

Under devel

DAN C MINING CO & C & D  
MNG CO

4 Brethren Bldg, Montrose  
Pres-Purch Agt: Daniel S Closser  
VP & Sec-Treas: Victor F Creasey

MYSTERY & SARAH ELLEN,

Slickrock, undergr,  $U_3O_8$ , V<sub>2</sub>O<sub>5</sub>

Asst Gen Mgr: Ross F DeSilia

Geol: Bill Morse

Mech Eng: Joe Valessques

Prod: 20 tons

DAVENPORT, W L

Breckenridge  
WELLINGTON MINE, 2 1/2 mi E  
of Breckenridge, undergr, Pb, Zn,  
Ag, Au

Mine Sup: Harold Horn

Mine Eng: Marvin Burger

Idle

W L DAVENPORT & DR F F  
GROSS, Operator

Box 182, Breckenridge  
MINIE MINE, 3 mi E of Brecken-  
ridge, Summit County, Au, Ag, Pb, Zn

DEAL MINING COMPANY, INC

Suite 23 America Bldg, Ft Collins

Pres: Arthur Wykert

VP: Melvin A Wykert

Sec-Treas-Purch Agt: Frank G Hooper

BLACK JUMBO MINE, Blue Mesa

Mine Dist nr Uravan, undergr,

open pit

DEFENDER MNG CO

660 Enid, Okla & Silver Cliff

Part: Roy Pratt, Vic Greer, Enid

E F Stacy, Wm Cody, Silver  
Cliff

DEFENDER MINE, undergr, Pb, Zn,  
Ag

Gen Mgr: E F Stacy

Under devel

MINING WORLD

**DENVER - GOLDEN OIL & URANIUM CO**  
700 Denver Club Bldg, Denver  
Pres: Charles O Parker  
VP: G H Brodie  
Sec: Roy O Goldin  
Treas: Barney Janow  
**SCHWARTZWALDER MINE** (Rainton Creek), Box 109, Golden, Jefferson County, U.S.A.  
Mine Mgr: E.C. Rice  
Ass't Mine Mgr: Clyde J True

**DENVER NABOS MNG CO**  
Lawson  
**NABOS MINE**, Clear Creek County, Ag., Pb, Zn  
Idle

**DEVEREAUX BROTHERS**  
P.O. Box 373, Meeker  
U.S.A. Prod

**DOUG DEVERICH MNG CO**  
1329 Colorado Ave, Grand Junction  
Under devel

**DILLON, RICHARD**  
Genl Del, Cortez  
U.S.A. Prod

**DIVERSIFIED RESOURCES INC**  
201 N 5th, Grand Junction  
PROPERTIES, Gateway Mng dist,  
Mesa County  
(See Utah)

**DOOPKE MNG CO**  
2431 N Nevada Ave, Colorado Springs  
Mgr: Frank D Doopke  
**GOLD KING, LEXINGTON, & MATTIE L MINES**, Teller County, Au  
Idle

**DOUBLE BUCK URANIUM INC**  
3239 West 3500 South, Salt Lake City, Utah  
Pres: B H Bertoch  
VP: W H Bertoch  
Sec-Treas: Allen K Bertoch  
**WALLY #1 MINE**, Eggers, undergr.  
U.S.A. V.O.  
Gen Mgr: B H Bertoch  
Mine Supt: Byrum Holt  
Under devel

**DOWELL & ASSOCIATES**  
Montrose  
U.S.A. Prod

**DOYLE URANIUM CORP**  
Box 1421, Colorado Springs  
Pres: M K Doyle  
VP: J D Stoen  
Sec-Treas: EG United  
**PITCH FORK MINE**, Naturita  
Gen Supt: Jim Galvay  
Geol: Cleo Bascom  
Undergr. U.S.A. prod

**DULANEY MNG CO**  
312 First Nat'l Bank Bldg  
Grand Junction  
Pres: R O Dulaney  
VP: C H Dulaney & Harry B Friedman  
Sec-Treas: Thomas E Potts  
Gen Mgr: Frank H MacPherson  
Gen Sup: Leroy Hemphill  
Geol: Philip P Powers  
**RADIUM GROUP OPER.**, 31 mi N of Dove Creek, undergr., U. V  
Prod: 175 tons

**E L DUNCAN MNG CO**  
P.O. Box 92, Dove Creek

**WALTER DUNCAN MNG CO**  
2212 1st Nat'l Bldg, Oklahoma City, Oklahoma  
U.S.A. Prod  
(See Ariz)

**E & H LEASING CO**  
Meeker  
**BURRELL #1 & LAST DAY MINES**, Montrose County, U

**EAST RIDGE CO**  
Box 566, Ouray  
Pres: Carlton E Byrne  
VP: F Moldenhauer  
Sec: Alice Davenport  
**ANDRUS MINE**, 14 mi NW of Silverton, undergr., Zn, Pb, Cu, Ag, Au  
Gen Mgr: Phillip V Doyle  
(See Calif)

**EGGERS, C F**  
Dove Creek  
**DOLORES APRIL MINE**, Stickrock dist, San Miguel County, undergr.,  
Prod: 20 tons

**ECKMAN, W B**  
Naturita  
U.S.A. Prod

**EMPERIUS MNG CO**  
Emperius Bldg, Creede  
Pres: T B Posson  
Treas: H B Haynes  
Gen Mgr: B T Posson  
**EMPERIUS MINE** (ROBINSON & AMETHYST), 1 1/3 mi N of Creede, undergr., Pb, Zn, Ag, Au, Cu  
Mine Supt: T B Posson  
Mine Firm: A M Davis, R R Lehman  
Prod: 150 tons  
**ISO-TON PLOT MILL**, 1 mi S of Creede  
Mill Supt: T B Posson  
Assay: Gordon H eselius

**EQUITABLE URANIUM CORP**  
1217 Cooper Bldg, Denver

Pres: Melvin C Bowles  
VP: A L Heflin  
Sec: Glenn C Leader, Jr  
**GOVERNOR MINE & CLAIMS**, Box 352, Bishop Canyon, Slick Rock Mng dist, undergr., U.S.A., V.O.  
Gen Mgr: Melvin C Bowles  
Supt: Vernon K Bowles

**ETA MINES**  
317 Main, Grand Junction  
Part: Frank L Seymour, Vernon Pick & Jim Martin  
**RAE MARIE MINE**, 10 mi W of Gateway, undergr.  
Mine Supt: James P Martin  
Under devel

**EUREKA TUNGSTEN CO**  
3255 S Cherokee St, Englewood Part: John S Keffler, E B Ralston  
**EUREKA MINE**, Sugar Loaf mng dist, Boulder County, undergr., W.O.  
Gen Mgr: E B Ralston  
Idle

**FEDERAL URANIUM CORP**  
215 N 5th, Grand Junction  
**LARK-LEIGHTON GROUPS**, Bull Canyon area, Montrose County  
(See Utah)

**FIBREBOARD PAPER PROD CORP** (Pabco Bldg Materials Div)  
1780 Montgomery St, San Francisco II  
OPEN PIT MINE, near Coaldale, gypsum  
Gen Mgr: R R Galloway  
(See Calif)

**FINCHER, OTIS**  
924 Pine St, Grand Junction  
**BONNIE #1 MINE**, Mesa County, U. V  
**FIRST NAT'L OIL & MINERAL CO**  
Box 206, Mancos  
**GOLD DOLLAR MINE**, Montezuma County, Ag., Pb, Zn

**FLANDERS MNG CO**  
(See Pacific Industries, Inc)

**JOSIE K POLSON MNG & MLO CO, LTD**  
4280 Holly Ave, St Louis 15, Mo  
Pres: Dr C R Curran  
VP: -  
Sec-Treas: Fred W Kublin  
**JOSIE K POLSON MINE**, Saguache County, undergr., Au, Ag, U.S.A.  
Gen Mgr: Fred W Kublin  
Idle  
(See Mo)

**FOOTHILLS MNG CO**  
3240 6th St, Boulder  
Pres: C A Wilcox  
VP: L F Jonick  
Sec-Treas: L B Sweet  
Purch Agt: C I Swaby  
**WRIGHT LEASE**, Idledale, undergr., U.S.A., V.O.  
Gen Mgr: C I Swaby  
Ass't Gen Mgr: V E Wilcox  
Gen Supt: C I Swaby  
Geol: H L Bird  
Under devel

**FORD URANIUM MINES**  
Monticello, Utah  
U.S.A. Prod

**FORGE HILL TUNNEL**  
Rt 2, Box 367, Golden  
Gen Mgr: Clifford E Morrison  
Ass't Mgr: W A Horne  
**FAIRMONT TUNNEL**, 1/2 mi SW of Russell Gulch, undergr., Pb, Zn, Ag, Au, Cu, U.S.A.  
Under devel  
(See Texas)

**FOSTER, HERBERT**  
1217 Colorado Ave, Grand Junction  
U.S.A. Prod

**FOSTER, RALPH**  
1217 Colorado Ave, Grand Junction  
**SNOW SHOE, MESA #5**

**FOUR CORNERS EXPLOR CO**  
Petroleum Bldg, Grand Junction  
Part: F O Mano, Irving Rapaport, Forrest Fischer

Field Geol: Forrest Fischer  
**BACHELOR MINE**, Box 63, Naturita, U.S.A., V.O.  
Prod: 40 tons  
Gen Supt: Chess Allmond  
(See N Mex)

**FOUR CORNERS URANIUM CORP**

220 Mile High Center, Denver 2

Pres & Gen Mgr: E H Sanders  
VP: E L Clark, A G Rydstrom, J W Gramlich, Sr

Sec-Treas: Taft Barrow

Conn Eng: C R Willey

Mng Eng: James Baldwin

**LYON CREEK & GREEN RIVER-MINES**, La Sal Canyon Dist, (Mtnk)

La Sal, Utah U.S.A., V.O.

Gen Supt: Joseph N Trudeau

**BULL CANYON GROUP (5)**, Bull Canyon Dist

Gen Supt: Joseph N Trudeau

**PALLAORE MINE**, Morrison

Gen Supt: Wesley E Smith

Total Prod: 60,000 tons per year

(See Utah), Who and Largo Uranium Corp, N Mex)

**FRONTIER RANGE MINES, INC**

Burns Vault Bldg, Denver

Pres & Gen Mgr: John Deersen

VP: Paul R Spencer, Robt S Michell

Sec-Treas: H P Macaulay

**MATTIE MINE**, Clear Creek County, Pb, Au, Ag, Idle

**MELVINA MINE**, Boulder County, Au

Idle

**STRONG & MARY CASHER MINES**, Teller County, Au

**KING SOLOMON GROUP**, Idle

**CLEAR CREEK MILL**, Dumont, Flat Capacity: 200 tons

**FRONTIER MNG CORP**  
130 W Main St, Grand Junction  
U.S.A. Prod

**FRONTIER OIL & MNG CORP**  
647 Glenwood Ave, Grand Junction

Pres: Wm J DeMik

Sec-Treas: David Katz

**MINE**, Idle

**GADDIS MNG CO**

1500 Mile High Center, Denver 8

**PROSPECT**, W of Vail Pass, Eagle County, Idle

(See Wyo)

**GARDNER & CO**

P O Box 252, Naturita

U.S.A. Prod

**GARFIELD MINE**

Box 209, Salida

Gen Mgr: W E Burleson

Contractor: Carl McMullen

**GARFIELD MINE**, 20 mi W of Salida, undergr., Pb, Au, Ag, Idle

**GARFIELD MINES, LTD**

302 Main St, Grand Junction

Pres: John Burton

VP: F Myers

Sec: Frank Nisley

Treas: J DeMik

**FALLER PROPERTY**, Rifle, undergr.

Geol: G C Ridland

Idle

**GAYNO MNG CO**

730 N 3rd St, Montrose

U.S.A. Prod

**GENERAL MINERALS CORP**

440 Meadow Bldg, Dallas 6, Texas

**DISTRICT OFFICE**

Petroline Bldg, Grand Junction

**SUMMITVILLE MINE**, Box 472, Montrose, Co., Au, Ag (Prospect), undergr.

Gen Mgr: Dr R V Gaines

Ass't Gen Mgr: Robert L Jones

Gen Supt: Royal Seressson

Under devel

(See Texas)

**GENERAL RESOURCES LTD**

554 Commonwealth Bldg, Denver 2

Pres: W E Roberts

VP: J S Carter

Sec-Treas: Clarence Casner

Under devel

**GORONIMO URANIUM MNG CORP**

345 S State St, Salt Lake City, Utah

**PARROT GROUP**, U.S.A. Prod

(See Utah)

**GIANT CYCLE CORP**

Box 86, Carlton Bldg, Colorado Springs

Pres: Merrill E Shoup

Exec VP & Gen Mgr: Max W Bowen

Ass't Gen Mgr: G Murray

Sec: H Bates

Treas: John Jacobs, Jr

(See D.D.)

**GIANT RESOURCES, INC**

P O Box 1451, Grand Junction

Pres: Donald J Kanaly

VP & Treas: Harold R Babcock

Sec: Clarence Corey

Gen Mgr & Purch Agt: Ed Strand

**LITTLE DORA & THE EMPIRE MINES**, Silverton, undergr., Ag, Pb, Zn, Au

Gen Supt: George Hazen

Geol: Warren Prosser

Mng Eng: Robert L Rock

Prod: 50 tons

**GIBRALTAR URANIUM & OIL CO**

Box 352, Grand Junction

Pres: I.W. Andrews, Jr

(See Ariz)

**GLOBE HILL MNG CO**

225A Independence Bldg, Colorado Springs

Pres: H J Anderson

VP: R. W. Beal

Sec-Treas: R. B. Murray

Ass't Secy: Julia Davison

**PHONOLITE MOUNTAIN URANIUM, MINE**, Cripple Creek, open pit

U.S.A., Autonite

Ass't Gen Mgr: Stan Balcomb

Gen Supt: George West

Geol: J. W. Anderson

Mech Eng: Lloyd Collard

Ass't Mine Supt: L. D. Anderson

Mine Firm: Earl Rebuck

**Colorado****GOLDEN DAWN URANIUM CORP.**

243 N 8th W, Provo, Utah  
Pres. Roy A. Shane  
VP: Walter J Eddy  
Sec-Treas: Dee Cavin  
Purch Agt: Veal S Perry  
MINE, Chaffee County, undergr.,  
 $U_3O_8$ , rare earths  
Gen Mgr: Verl S Perry  
Geol: Roy A. Shane  
Mine Frm: Joseph V Dodge  
Under devel

**GOLDEN EAGLE MNG CORP**

159 Colorado Ave, Grand Junction  
GOLDEN EAGLE MINE, Leadville,  
Lake County, Au  
Idle

**GRAMLICH MINERALS INC**

Mesa, Utah  
 $U_3O_8$  Prod

**GREAT BASINS PETROL CO**

1515 Mile High Center, Denver 3  
Pres. C G Glasscock, Jr  
Exec VP: W E Morgan  
VP: C L Caness  
Sec-Treas: M H Goforth  
KEYSTONE, SANTA MARIE,  
RAINBOW MINES, near Dove Creek,  
open pit,  $U_3O_8$ , V  
Geol: Howard H Odiorne

**GREAT FRONTIER MNG CORP**

647 Glenwood Ave, Grand Junction  
Pres. Wm J DeMik  
Sec-Treas: David Katz  
CEDAR POINT MINE, undergr.  
Gen Mgr: S P Clyburn  
Contract Miner Bert Foster  
Idle

**GREAT LAKES CARBON CORP**

Rosita  
ROSITA MINE, Rosita, surface,  
perlite  
100-TON MILL, Florence  
(See Calif., Nev., N Mex, Oreg.)

**GREAT NORTHERN URANIUM CO**

Uravan  
 $U_3O_8$  Prod

**GREAT WESTERN AGGRE-GATES, INC**

806 Boston Blvd, Denver  
Op. Ernest W Munroe  
GOODWIN QUARRY, surface, gypsum

**GREEN RIVER OIL & URANIUM CO**

26 W Broadway, Salt Lake City,  
Utah  
Pres. Falas M Kelly  
Sec-Treas Austin B Smith  
VANADIUM QUEEN MINE, San  
Miguel County, undergr.,  $U_3O_8$   
Gen Sup: Richard Dillon  
Prod: 6 tons  
(See Utah, Wyo.)

**GREENLEE, W. G.**

Cortez  
 $U_3O_8$  Prod

**GREENWALD MNG CO**

Box 87, Placerville  
EL CAPITAN MINE, San Miguel  
County, Cu  
Idle

**GRIPE, WOODROW E (Lessor)**

Box 225, Naturita  
EARLY MORN, Big Gyp Valley,  
undergr.,  $V_2O_5$ ,  $U_3O_8$   
Prod: 2 tons  
WALLEY'S CLAIM, Slickrock dist.,  
 $V_2O_5$ ,  $U_3O_8$   
Prod: 10 tons

**GULF COAST WESTERN OIL CO**

515 Republic Blvd, Oklahoma City,  
Oklahoma  
DEVEREAUX GROUP, Meeker,  
undergr.,  $U_3O_8$ , V  
Supt. R E Miller  
Frm: Rex Sterry  
Prod: 10 tons  
Under devel  
(See Okla.)

**GUM TREE MNG SYNDICATE**

c/o E G Robertson, 2360 Cherry St.,  
Denver  
GUMTREE MINE, near Idaho Springs,  
Au, Pb  
Idle

**GUNNISON MNG CO**

Box 539, Gunnison  
Pres: Vance E Thornburg  
VP: Dr Garth W Thornburg  
Sec-Treas: George M Hill  
Purch Agt: William R Johnson  
Off Mgr: Duffy Salinger  
LOS OCHOS MINE, Approx 23 mi SE  
of Gunnison, undergr.,  $U_3O_8$   
Geol: J D O'Brien  
Mine Sup: Leslie C Ross  
Asst Mine Sup: F D Koklich  
Mine Eng: James Coan  
Mine Frm: William R Green  
Prod: 135 tons  
200-TON MILL, Gunnison  
Mill Sup: Cole D Neff  
Mill Frm: Wes VanGordon

**H & H EXPLOR & ENGR CO**

Rm 215, 1129 Colorado Ave,  
Grand Junction  
Pres & Gen Mgr: J H McGarr  
VP: Wm C Noonan  
Sec-Treas: Gene Day Crissman  
PAYROCK, Mesa City, undergr.,  
 $U_3O_8$   
Gen Mgr: John Hill  
Under devel  
(Op under property management  
contract)  
150-TON PLOT MILL, at mine

**HARDY ABLE MNG CO**

Mesa  
 $U_3O_8$  Prod

**HARTMANN URANIUM CO**

1129 Colorado Ave, Grand Junction  
HASSELBUSH, RAY &  
ZIESEMISS, HENRY  
Box 491, Rifle  
MIDNIGHT MINE, 10 mi NE of  
Meeker, undergr., U, V  
Undergr prod  
Under devel

**HERCULES MINING CO**

2305 East St, Golden  
Pres. Walter H Wahl  
VP: LeRoy Westcott  
Sec-Treas: Opal Wahl  
SUNSET MINE, 1/2 of Ft Collins  
undergr.,  $WO_3$ , Tl, Ag, Au  
Gen Mgr: Walter Wahl  
Asst Gen Mgr: LeRoy Westcott  
Consult Eng: Dr Arthur Wichmann  
Under devel  
PLOT MILL (under const.)

**HERLACHER MNG CO**

219 W 3rd, Pueblo  
Lesser Victor C Herlacher  
PEERLESS I, 2, 3 MINES, Custer  
County, Cu  
Under devel

**HETZEL, LEE**

Clifton  
 $U_3O_8$  Prod

**HIDDEN SPLENDOR MNG CO, THE**

215 N 5th, Grand Junction  
(See Utah)

**HILL - PI DEVEL CORP**

1625 Maple Court Ave, P O Box  
1587, Grand Junction  
Pres & Gen Mgr: Worth W Offutt  
VP: L P Ladusaw  
Sec-Treas: H E Bell  
HOC CREEK & RANDY'S SHAMROCK  
MINES, approx 3 mi E of La Sal  
Junct, undergr., open pit,  $U_3O_8$ ,  
 $V_2O_5$   
Geol: Jess Carruthers

**HOBBS MNG & DEVEL CO**

Box 1923, Hobbs, N Mex  
FREELAND EXTENSION, Clear  
Creek County, Au  
Under devel

**HOLDEMAN, E T**

Uravan  
LONG PARK #6 & #12 MINES, 13 mi  
SE of Uravan, undergr., U, V  
Mine Sup: E T Holdeman  
Mine Frm: Calvin O'Bryant

**HOLLING, HENRY**

P O Box 7, Egger  
 $U_3O_8$  Prod

**L M HOLLINGSWORTH**

Box 187A, Morrison  
MADONNA LODE, Jefferson City

**HOLT, HARVEY**

Blanding, Utah  
 $U_3O_8$  Prod

**J M HUBER CORP**

PO Box 831, Borger, Texas  
 $U_3O_8$  Prod

**HUMPHREYS GOLD CORP**

910 1st Nat'l Bank Bldg, Denver 2  
Pres: A E Humphreys  
VP: I B Humphreys  
VP: Jay P Wood (Jacksonville, Fla)  
VP & Treas: Judson S Hubbard  
Sec. W T Hostetter  
(See Fla)

**HUNT, ALVA**

Rt 4 Box 87, Montrose  
BELL GROUP, WINDY-DAY GROUP,  
Lower San Miguel, undergr.,  $U_3O_8$ ,  
 $V_2O_5$   
Under devel  
(Leased to Page Mng Co, Br of Park  
City Consol Mines)

**HUNT OIL CO**

Grand Junction  
URANIUM CLAIMS, San Miguel Cty,  
Montrose Cty, Cu,  $U_3O_8$   
Under devel  
RIDDLE LEASES, Paradox Creek,  
 $U_3O_8$   
(See Utah)

**IBEX URANIUM INC**

P O Box 550, Monroe  
Pres: Theodore L Brooks  
VP: Jack R Cagle  
Sec-Treas: Stewart C Lee  
Geol: Max & Krey  
MINES & CLAIMS, Montrose & San  
Miguel Counties, undergr.,  $U_3O_8$   
Under devel  
(See Wyo)

**IDANO MARYLAND MINES CORP**

Grass Valley, Calif  
 $U_3O_8$  Prod  
(See Calif., Utah)

**IDARADO MNG CO**

Ourray  
Pres: M D Banghart  
IDARADO MINES, 12 mi SW of Ouray  
on Red Mt & TELLURIDE MINES at  
Pandoa, undergr., Cu, Pb, Zn  
Gen Mgr: John S Wise  
Gen Sup: C H Hillander  
Mine Sup: John Kearney  
Ch Clerk: Geo C Forbes  
Mech Sup: W L Griffiths  
Ch Eng: Jack C Keenan  
Prod 1,800 tons  
PLOT MILL, Pandoa  
Sup: M A Jorgenson  
Capacity: 40,000 tons ore per mo

**INLAND DEVEL CORP**

3975 E 5th Ave, Denver 16  
Pres: E M Stone  
VP: H S Dickson  
Sec. C H Launer  
Treas: Jas B McDonald  
BILL & BUD MINE, Coaldale, open  
pit,  $U_3O_8$   
Mine Sup: Wm B Harvey  
Ass't Mine Supt: Wm Ogden  
Under devel

**INTERNAT'L MINERALS & CHEMICAL CORP**

CONSOL FIELDS/PAR DEPT  
20 Wacker Dr, Chicago 6, IL  
FELDSPAR MILL, Denver  
Gen Sup: L W Comer  
Prod: 100 tons daily  
MICHA PLANT, Pueblo, dry grinding  
Gen Sup: C M McDaniel  
(See Aris, Fla, Ill, Me, Miss,  
N Mex, N.C, Okla, Tenn, Va, Wyo)

**INTERSTATE MNG & EXPLOR CORP**

1036 1st Nat'l Bank Bldg, Denver 2  
Pres: S R Mahoney  
VP & Treas: L H Seagrave  
Sec. W G Dillon  
VP: B C Heath  
(See Aris)

**IVANHOE TRUST CO**

Kansas  
QUEEN OF THE WEST MINE,  
Summit County, Cu  
Mgr: L Deay-Reusch  
Idle

**JARMAH & HADDEN**

P O Box 388, Cortez  
 $U_3O_8$  Prod

**JEFFREY & ULIBARRI**

Montezuma  
QUAIL, WATERLOO, NEW YORK  
MINES, Summit County  
Idle  
SILVER KING MINE, Summit County  
PLYMOUTH MILL  
Under devel

**JOE DANDY MNG CO**

334 Independence Bldg, Colorado  
Springs  
Acting Pres & VP: Vernon Mitchell  
Gen Mgr & Treas: A S Konzelman  
Sec: C E Yoes  
Sup: Harry Allen  
JOE DANDY, C-O-D, COMMON-  
WEALTH, HILLSIDE, CLIMAX  
VICTORY & SEATTLE MINES,  
3-5 mi E of Cripple Creek, undergr.,  
surface, Au  
Idle

**JOHNSON BROS & PRIME**

Nederland  
HOOSIER MINE, WO  
Under devel

**HUGO W JOHNSON & CO**

P O Box 257, Nucla  
 $U_3O_8$  Prod

**JOHNSTON MNG CO**

2009 E 6th St, Pueblo  
Sec: Eugene C Guild  
LITTLE JENNIE MINE, Saguache  
County, Cu  
Under devel

**JONES LEAD & ZINC MINES CO**

Box 921, Leadville  
Own: Robert L Jones  
GARIBALDI MINE, 2 mi E of  
Leadville, undergr., Pb, Zn, Au, Ag  
Idle  
RESURRECTION #2, 2 mi E of  
Leadville, undergr., Pb, Zn, Au, Ag  
Idle

**JOSEPH, ED.**

Normwood  
 $U_3O_8$  Prod

**ROY KAMHOLZ MNG**

Eggar  
CHARLES T2, T4 MINES, undergr.,  
 $U_3O_8$ ,  $V_2O_5$

**KANARADO MNG & DEVEL CO**

Box 27, Ohio  
Pres: Charles Vashus  
VP: B V Warren  
CARTER MINE, Gunnison Cty, Au, Ag  
Under devel  
PLOT-AMAL MILL

**KELLY, MARK**

Naturita  
 $U_3O_8$  Prod

**KENDRICK BAY MNG CO**

Mines Park, Golden  
Pres: Frank Coolbaugh  
VP: John J Curzon  
Sec: John P Fitz-Gibbon  
Treas: Thomas E Congdon  
(See Alaska)

**KERR - McGEE OIL INDUS-TRIES, INC**

4931 E 38th Ave, Denver 7  
RESEARCH LABORATORY  
Mgr: V L Mattson  
(See Aris, N Mex, Okla, Wyo, and  
Kernac Nuclear Fuels, Colo, N Mex)

**KINGDOM URANIUM & MNG CO**

P O Box 268, Aurora 8  
Pres & Gen Mgr: Ben J Filla  
VP & Treas: N B Filla  
Sec: G K Hollingsworth  
MINE, open pit,  $U_3O_8$   
Under devel

**KIRK BASIN URANIUM CORP**

3101 Winthrop Ave, Box 9338,  
Pt Worth, Texas  
AUSTIN MINE, 608 Rodd Ave, Grand  
Junction, undergr.,  $U_3O_8$ ,  $V_2O_5$   
Mng Eng: Francis X Corbett  
Prod: 5 tons  
(See Texas)

**KNIGHT MINING CO**

2422 Grove St, Denver 11  
NEW YORK MINE, Summit City,  
Au, Ag, Pb, Zn

MINING WORLD

**KITTIMAC MINING CO**  
P O Box 341, Silverton  
Own: Walter A Bentley  
**KITTIMAC MINE**, 11 mi NE Silverton  
in Minnie Gulch, undergr., Ag, Cu,  
Pb, Zn, Au  
Prod: 8 tons (under devl)

**KOSTELIC, LOUIS**  
203 W 3rd St, Leadville  
**BI-METALLIC & FREE COINAGE**  
MINE, Lake City, undergr., Au, Ag, Pb  
Prod: 4 tons  
**20-TON GRAV MILL**, Leadville  
Mill Supt: Louis Kostelic  
Under devel

**L & L URANIUM CO**  
923 1st Nat'l Bank Bldg, Denver 2  
**EXPLOR & PROP.**, various parts of  
Cerro  
Mts  
(See Wyo)

**LBJ MINING CO**  
P O Box 1065, Rifle  
Own: R R Jones, R E Linker  
**BREADLINE MINE**, Rifle, undergr.,  
U<sub>3</sub>O<sub>8</sub>, U<sub>3</sub>O<sub>8</sub>  
Under devel

**LA GARITA MINES**  
P O Box 81, La Garita  
**CRYSTAL BUTTE LODE**, Au  
Under devel

**LAKALUCRE MINES, INC**  
Box 237, Cortez  
**URANIUM PROP.**, under devl

**LAMBERTSON, JOHN**  
Box 567, Gunnison  
**STAR MINE GROUP**, 55 mi N of  
Gunnison, undergr., Pb, Ag

**LA SALLE MNG CO**  
Box 217, Grand Junction  
Part: M M Hardin, Roy M Eidal,  
G T Rummel, M P Rose  
**CLUB MESA MINE**, undergr., U<sub>3</sub>O<sub>8</sub>,  
V<sub>2</sub>O<sub>5</sub>, Uravan  
Co-Supt: M P Rose, G T Rummel  
Under prod  
**UNDEVEL MNG PROP.**, various  
parts of Colo  
(See N Mex, Utah)

**LEAD CARBONATE MINES,**  
**INC**  
c/o Henry P Ehrlinger, Box 160,  
Silverton  
**LEAD CARBONATE MINE**, Ag, Pb, Zn  
Under devel

**LEADVILLE LEAD CORP**  
308 Colorado Bldg, Denver  
Pres: Robert G Risk  
VP: Harvey Tedrow  
Sec: Byron White  
Treas: Kenneth Miller  
Gen Mgr: James Tiffany  
**HILLTOP MINES**, Fairplay, undergr.,  
Pb, Zn, Ag, Cu  
Under devel

**LECLAIR CONS MNG CO**  
Box 127, Cripple Creek  
Gen Mgr: Max W Bowen  
**MINE**, Cripple Creek, Au  
Under devel

**LEE & SMALL MNG**  
431 Main St, Montrose  
Stewart Lee, U A Small, 135 S  
3rd St W, American Fork, Utah  
Geol: Max Key  
**MINES & CLAIMS**, Montrose &  
San Miguel Counties, undergr., U<sub>3</sub>O<sub>8</sub>  
Under devel  
(See Utah)

**LEHR, VERNON**  
Gateway  
**MINE**, Calamity Mesa, 17 mi E of  
Gateway on Uncompahgre Plateau, U

**LE RU MNG CO**  
Gen Del, Cortez  
U<sub>3</sub>O<sub>8</sub> Prod

**LISBON URANIUM CORP**  
2009 Hwy 50, Grand Junction  
**GATEWAY PROPERTIES**, Beaver  
Mesa, U<sub>3</sub>O<sub>8</sub>  
Contractor: Charles V Woodward  
Prod: 750 tons per mo  
(See Mont, N Mex, Utah, Wyo)

**LISBON VALLEY URANIUM CO**  
501 Kittredge Bldg, Denver  
**CHAUTAUQUA MINE**, Summit City,  
Ag, Pb, Zn  
Mills, at mine  
**SILVER PLUME TUNNEL**, DIVES-  
PELICAN GROUP, RED ELEPHANT  
GROUP, Clear Creek City, Au, Ag,  
Pb, Zn

**LITTLE JONNY MINES INC**  
400 E 4th Ave, Leadville  
**FANNY RAWLINGS MINE**, Lake City,  
Ag, Pb, Zn  
**IBEX OPER NO 2**, Lake City, Au  
Under devel

**LOST CANYON URANIUM &**  
**OIL CO**  
224 First Nat'l Bank Bldg  
Albuquerque, N Mex  
**LOUISE & KATHRYN MINES**, undergr.,  
Mts  
(See N Mex)

**LUCILLE'S URANIUM MINE**  
#168  
Meeker  
Pres & Gen Mgr: Rev Willis S Jones  
VP: Mrs Nancy Jones  
Sec: Miss Anna F Richardson  
MINE, Meeker, open pit, U<sub>3</sub>O<sub>8</sub>,  
V<sub>2</sub>O<sub>5</sub>  
Mine Supt: Louise Smith  
Mine Eng & Ass't Supt: Rev W E W Brown  
Geol: H E Vitz  
Under devel

**M & M MNG CO**  
c/o R G McKinley, Buena Vista  
**LAST CHANCE MINE**, Chaffee City,  
Au  
Under devel

**M & S INC**  
Salida  
Pres: J W Magnuson  
Gen Mgr: R H Magnuson  
**HOMESTAKE MINE**, surface, feldspar

**MAGDALENA MNG & MLG**  
CO  
P O Box 7425, Denver 15  
Pres: W R Johnson  
VP & Gen Mgr: R M Conrad  
Sec-Treas: James C Capen  
Ass't Sec: E Griesinger  
(See N Mex)

**MAGIC URANIUM CO**  
P O Box 58, Moab, Utah  
U<sub>3</sub>O<sub>8</sub> Prod

**MALCO EXPLOR CO, INC**  
(Formerly Uranium Corp of America)  
P O Box 26, Los Alamos, N Mex  
8 CLAIMS, Lindy Point, Mesa City,  
near Gateway, U<sub>3</sub>O<sub>8</sub>  
Under devel  
(See N Mex, Utah)

**MARKEY MNG & EXPLOR**  
CO  
Cripple Creek  
Mgr: Lee Brown  
**TENDERFOOT PROPERTY**, Au  
Under devel

**MARTINEZ MEDINA &**  
**DOWELL**  
P O Box 342, Uravan  
U<sub>3</sub>O<sub>8</sub> Prod

**MARCY-SHENANDOAH CORP**  
Jarvis Bldg, Durango  
Pres: S Stokes Tomlin, Jr  
VP: Edward M Barge  
Sec: Robert M Shell  
Treas: Robert R Smogroff  
**GARRY OWEN MINE**, Silverton, Ag,  
Pb, Zn  
**SHENANDOAH-DIVES MINE**, Silver-  
ton, Au, Ag, Pb, Zn  
Gen Mgr: S Stokes Tomlin, Jr  
(See Ariz, Utah)

**MARY MURPHY GOLD MNG**  
CO  
Box 209, Salida  
Gen Mgr: W E Burleson  
Res Mgr: H Van Aken  
MINE, 4 mi SW of St Elmo, undergr.,  
Au, Ag, Pb, Zn  
Fr: Henry Carey  
Mile  
(Leased to W E Burleson)

**MAUPIN, ED**  
Nucla  
U<sub>3</sub>O<sub>8</sub> Prod

**MAY DAY MNG CO**  
Box 561, Silverton  
Mgr: Ennis Cole  
**MAY DAY MINE**, Ag, Pb, Zn  
Idle

**LUCKY DOG MINE**, Uravan

**MAYFIELD, JERRY**  
P O Box 251, Naturita  
U<sub>3</sub>O<sub>8</sub> Prod

**MAYFIELD, PAGE & NEILSON**  
P O Box 92, Delta  
U<sub>3</sub>O<sub>8</sub> Prod

**MAYFLOWER MNG &**  
**PETROLEUM CO**  
P O Box 528, Ouray  
**DOUBLEHEADER MINE**, Chaffee  
County, Ag, Pb, Zn

**McALESTER FUEL CO**  
P O Box 783, 209 E Wyandotte,  
 McAlester, Oklahoma  
pres: J G Puterbaugh  
VP & Gen Mgr: Tom E Garrard  
Sec-Treas: Carl Oman  
Geol & Mine Eng: Robert Ford (P O  
Box 428, Riverton)  
**MEEKER MINE**, open pit, U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Gen Supt: Ralph Hawks

**MCGOW AGGREGATES**  
1641 St Paul St, Denver  
**NO NAME CRATER**, 5 mi NW of  
McCoy

**MCCORMICK, WM R**  
Dove Creek  
U<sub>3</sub>O<sub>8</sub> Prod  
3-B

**MCFLARD & HULLINGER**  
80 West Vine St, Box 238,  
Tooele, Utah  
**COPPER KING MINE**, Route City,  
Au, Ag, Cu, Pb  
(See Ariz, N Mex, Utah)

**MAWA MNG CO**  
4925 Montview Blvd, Denver 7  
Pres & Gen Mgr: Joseph W Walsh  
VP: M W Walsh  
Sec-Treas: Paul L Schmitz  
**MENA MINE**, Golden, Jefferson  
Cty, undergr., U<sub>3</sub>O<sub>8</sub>, Cu, Ag  
Gen Supt: H L James  
Mine Frm: Gardner L Kingry  
Geol: A Bird  
Prod: 10 tons  
**PRINCESS OF INDIA MINE**, Lawson,  
Ag, Pb, Cu, Au, Zn  
Prod: 6 tons  
Mine Supt: Lee Nabcock

**MENDOTA FROSTBURG MNG**  
CO  
Stockyard Station, Box 6630,  
Denver  
Pres: D V Watrous  
**MENDOTA MINE**, Clear Creek  
County Ag, Pb, Zn  
Idle

**MICRO COPPER CORP**  
Marshall Court, Moab, Utah  
Pres: Richard N Mohler  
Sec & Treas: Elliot R Cook, Jr  
**MARTIN MESA & CARPENTER**  
FLAT MINES, 12 mi N of Uravan,  
undergr., U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Gen Supt: Evangeli Blackburn  
Prod: 15 tons

**MID-CONTINENT URANIUM**  
CORP  
201 Uranium Center Bldg, Grand  
Junction  
Pres: D Lew Williams  
VP & Gen Mgr: Norman E Khley  
Sec-Treas: Mark D Dunn  
Purch Agt: John E Danielson  
Geol: Coy M Mobley  
(See N Mex)

**MIDGET MINE CO**  
Cowdrey  
Pres: Walter Symington  
**MOLYBDENUM NO 1 MINE**, Jackson  
County, Au  
Idle

**MILLER, M E**  
PO Box 117, Piocheville  
U<sub>3</sub>O<sub>8</sub> Prod

**MINERALS CORP OF**  
**AMERICA**  
201 N 5th, Grand Junction  
(See Utah)

**MINERALS ENGR CO**  
801 Fourth Ave, Grand Junction  
Pres: Blair Burwell  
VP: R G Sullivan  
Sec-Treas: C A Walt  
Purch Agt: Ruth Stewart  
**DIAMOND & WAGON DRILLING**  
CONTRACTING  
(See Mont, N Mex, Utah)

**MINES DEVELOPMENT, INC**  
517 Farmers Union Bldg, Denver  
Exec VP: Allen D Gray  
Sec-Treas: W H Hooley  
Prod Mgr: G T Bator  
Met Consultant: H L Hazen  
(See S Dak)

**MNG RESEARCH CORP**  
4215 Balsam St, Wheatridge  
Pres: Clinton W Livingston  
VP: J Stirling Livingston  
Sec: Helen J Livingston  
MINE, undergr., surface, U<sub>3</sub>O<sub>8</sub>  
Gen Mgr: C W Livingston  
Geol: B M Hardman  
Supt: J M Mostman  
Under devel  
(See S Dak)

**MINING VENTURES**  
303 Bon Durant Bldg, Salida  
VENTURE NO 2, Chaffee County,  
W<sub>3</sub>O<sub>8</sub>  
Idle

**MOLYBDENUM CORP OF**  
AMERICA

Empire  
**URAD MINE & MILL**, undergr., Mo,  
Moil  
Mgr: John B Carman  
Under devel  
(See Calif, N Mex, N Y Pa)

**MOLLIE KATHLEEN MNG CO**  
Cripple Creek  
**MOLLIE KATHLEEN MINE**, Au

**MONOGRAM URANIUM & OIL**  
CO

205 Petroleum Bldg, Grand Junction  
Pres: Ray Baxter  
VP: Howard F Carr  
Sec-Treas: George E Dilts  
**GROUND HOG MINE**, Naturita,  
undergr., U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Mine Supt: Joseph N Trudgen  
Prod: 18 tons  
(See Utah)

**MONOGRASS URANIUM**  
Naturita  
U<sub>3</sub>O<sub>8</sub> Prod

**MONTEZUMA URANIUM, INC**  
Montezuma  
c/o Tom E Martin & Patrick J  
Vinson  
**MINE**, Collier Mtn, near Montezuma  
U<sub>3</sub>O<sub>8</sub>  
Prod

**CHATAQUA MINE & MILL**  
PAY MASTER MINE  
Under devel

**MORENO URANIUM CORP**  
731 Cooper Bldg, Denver  
Pres: Dr Edward L Clark  
VP: Howard Baisley  
Sec-Treas: Ray Bennett  
**SILVER QUEEN MINE**, Silverton, Pb,  
Zn, Au, Ag  
Idle

**LEYDEN URANIUM MINE**, Lyden,  
U<sub>3</sub>O<sub>8</sub>  
Idle  
(See Utah)

**MORGAN MINERALS CORP**

765 Denver Club Bldg, Denver 2  
Pres: Arnold O Morgan  
VP: Howard R Ghoshan  
Sec-Treas: H Schieffer  
**SUNRISE & PATTY MINES**, Neola,  
undergr., U<sub>3</sub>O<sub>8</sub>, V  
Gen Mgr: H R' Ghoshan  
Supt: James L Capp  
Geol: M F Ayler  
Prod: 25 tons

**MTN STATES OIL &**  
**URANIUM CO**  
738 Univ Bldg, Denver 2  
U<sub>3</sub>O<sub>8</sub> Prod

**MOUNTAIN STATES URAN-**  
**JUM, INC**  
P O Box 1752, Denver 15  
Pres & Gen Mgr: James R Manning  
VP, Treas & Ass't Gen Mgr: Peter  
Nelson

Sec: Grace Brown  
Mine Eng: Paul M Hopkins  
**BUFFALO #1 MINE**, Jamestown,  
undergr., U<sub>3</sub>O<sub>8</sub>  
Under devel

## Colorado

MOUNTAIN TOP MNG & MLG CO  
158 Colorado Ave., Grand Junction  
LEASER, Montrose County, U.S.A.  
(See Utah)

NABOB DEVEL CO  
812 Majestic Bldg, Denver  
Pres: C R Froman  
VP: G F Criles  
Gen Mgr: Chas O Parker  
Treas: E M Stuart  
NABOB MINE, 3 mi S of Lawson,  
undergr., Ag, Pb, Au, Cu  
Sup: Chas O Parker  
Under devel

NATIONAL CONSOL MNG CORP  
Box 550, Salida  
COCOMONGO MINE, Saguache  
County, Ag, Pb, Zn  
Under devel

NATIONAL LEAD CO, INC  
(MEMBER OF NUCLEAR METALS  
DIV OF NATIONAL LEAD CO)  
Grand Junction  
Mgr: R G Veverly  
Tech Dir: Charles K McArthur  
AEC PILOT PLANT  
Plant Supt: W D Charles  
Met Eng: Harold Ford, Howard Dixon,  
Merle Peters, J R Roark  
Research Eng: Harry Gardner  
Mech Eng: J Kalmar  
Ch Chem: John Crosier  
Acid Plant Frm: Ralph Shimmins  
Alkaline Plant Frm: Guy Winslow  
Maint Frm: Paul Davis  
(See Utah & National Lead Co, NY)

NATOMAS CO  
Fairplay  
DREDGE #1, Park County, Au, Ag  
Local Supt: Webb Skinner  
Idle  
(See Calif)

NAVAJO MINERAL FUND INC  
223 Fremont St, Las Vegas  
Pres, Gen Mgr: J J Saitin  
VP: Nelson Hall  
Sec-Treas: R Saitin  
SMILIN ANN & SHOLOM MINES,  
Lake George, undergr., U<sub>3</sub>O<sub>8</sub>, Fe,  
limestone, alluvium  
Geol-Mine Eng: R Shultz Douglas  
Under devel

NETHERLAND MINES, INC  
Office of Sec: 991 Ave of the  
Americans, New York, N.Y.  
Pres: Carl Rosen  
Exec VP & Sec: G A Horwath  
CARIBOU MINE, 1408 Pearl St,  
Boulder, 3 mi W of Nederland,  
undergr., Ag, Pb, Au  
Gen Mgr: Matthew Olson  
Idle  
100-TON PLOT MILL, 6 mi E of  
Nederland

NEESHAM MNG CO  
Nucla  
Gen Mgr: Glenn D Neesham  
BUCKSKIN MINE, Bull Canyon,  
undergr., U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
PEGGIE, Saucer Basin, U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Under devel  
RUSTY MINE, undergr., U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>

NEILSON, CLARENCE L  
P O Box 456, Telluride  
U<sub>3</sub>O<sub>8</sub> Prod

NEPTUNE URANIUM CORP  
2825 Walnut St, P O Box 927,  
Denver 1  
Pres: W E Griffith  
VP & Gen Supt: L A Griffith  
Sec: Ray Carson  
Treas: Fred Burns  
SHAMROCKS, KINGPINS & OTHER  
MINES, undergr., U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Geol: Paul H Keating  
Prod: 1-5 tons  
Under devel

NEVADA MINES CO  
c/o Walter J Timney, 3000 Pinto  
Lane, Las Vegas, Nev  
CORA GROUP, Saguache County  
Ag, Pb, Zn  
Under devel

NEW DOMINION MNG CO  
Ophir  
Mgr: Randolph Bellisle  
NEW DOMINION MINE, Ophir, Au,  
Ag, Pb  
GRAV MILL  
Idle

NEW IDRIJA MNG & CHEM CO  
Idria, California  
Pres: C Hyde Lewis  
Sec-Treas: M A Burgess  
URANIUM DIVISION, P O Box 214,  
Getway, undergr., U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Div Mgr: Arthur W Gorring  
JOHNNIE MAE MINE, Beaver, Mesa,  
undergr., U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
PACK RAT, SHAKIN QUACKIE &  
HUBBARD HOMESTEAD MINES,  
Beaver Mesa, undergr., U<sub>3</sub>O<sub>8</sub>,  
V<sub>2</sub>O<sub>5</sub>  
(Licensed to Beaver Mesa Uranium, Inc)  
(See Calif & Texas)

NEW JERSEY ZINC CO  
EMPIRE ZINC DIV  
Gilman  
Western Mgr of Mines: Frank J Malott  
Supt, Gilman Open W L Jude  
Plant Chief: Harold Steinmier  
Proc Supt: Frank Sherwood  
Accountant: Darrell C Barnes  
EAGLE MINE, undergr., Pb, Zn  
Mine Chief: A M Karswick  
1,200-TON PLOT MILL  
Mill Frm: Foster J Withauer  
(See Ill, N.J., N Mex, N.Y., Pa, Tenn,  
Va, Wis)

NEW PENN MINES, INC  
Camp Seco  
Pres: R F Playter  
Sec: J H Nichols  
PENN MINE, 1 mi W of Camp Seco,  
Cu, Zn, Ag, Pb, Au  
Idle  
200-TON PLOT MILL

NEW WORLD EXPLOR.  
RESEARCH & DEVEL CORP  
Texas Creek

TAYLOR MINE, 10 mi W of Texas  
Creek, undergr., U<sub>3</sub>O<sub>8</sub>  
Idle  
(See Utah)

NORBUTTE CORP  
215 N St, Grand Junction  
VP: DeWitt Deringer  
Mgr, Western Mng Div: Abbott Charles  
Geol: Kirby C Coryell  
(See Utah, Wyo)

NORTH STANDARD MNG CO  
Box 808, Provo, Utah  
MINE, BULL CANYON, Naturita,  
undergr., U<sub>3</sub>O<sub>8</sub>  
Mine Frm: Marvin R Conley  
Prod: 15 tons  
MILL, Grand Junction  
(See Nev, Utah)

NORTHWESTERN MNG &  
PETROLEUM CO  
442 1/2 Main, Grand Junction  
Idle

OKAN URANIUM CORP  
835 Hall Ave, Grand Junction  
U<sub>3</sub>O<sub>8</sub> Prod

OLIVERS BROS  
Norwood  
AMERICAN EAGLE MINE, San  
Miguel County, U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
OREGON COMPANY  
210 Mercantile Bldg, Denver  
Pres: C V Liljenquist  
Dir-Office Mgr: Sam Milano  
HERCULES MINE  
JOE & JOHN MINE  
HENRIETTA MINE (all) San Juan Cty,  
Ag, Pb, Zn  
Idle

ORO FINO CONS MINES CO  
Box 422, Auburn  
Pres: G A Nugent  
Treas: J C Kempanee  
ORO FINO MINE, 4 mi from Auburn,  
undergr., Au, Ag  
Idle

ORTMAYER MNG CO  
320 S 1st St, P O Box 1846,  
Grand Junction  
Pres: C G Ortmayer  
Vt: Hilda Ortmayer  
Sec: John Speight  
LEON LEASE, Egnar, undergr.,  
U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Gen Mgr: Frank Turman  
Mine Frm: W L Ellison

OTTER CREEK URANIUM  
& MNG CO  
OTTER CREEK URANIUM  
& MNG CO  
Box 886, Silverton  
Pres & Gen Mgr: H P Ehrlinger

VP: J F Lacey  
Sec: V W Tooley  
VALLEY RANCH MINE, undergr.,  
U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Undergr Prod  
Idle

OUTLET MNG CO  
Box 35, Creede  
Perch Agt: James M Muir  
PHONIX LODE, 3 mi N of Creede,  
undergr., Pb, Ag, Au  
Mine Supt: Gavin W Skinner

ÖZAKI - MAHONING CO

MNG DIV  
310 W 8th, Tulsa, Okla &  
Rockdale, Ill  
NORTHCATE MINE, undergr., open  
pit, Thoropas, Cowdry  
Gen Supt: R K Wisco  
Mine Supt: M P Choonan  
Prod: 325 tons

350-TON PLOT MILL, at Northgate

mine  
Mill Supt: Gus Paris  
EMMETT & AFTERTHOUGHT MINES,  
undergr., Thoropas  
Conc: N B Williamson  
Prod: 120 tons

120-TON PLOT MILL, at Jamestown  
Mill Supt: P H Baker  
(See Ill, N Mex, Okla)

PACIFIC INDUSTRIES, INC.  
FLANDERS MNG CO (wholly  
owned subsid)

Box 861, Grand Junction  
Pres: Robert E McDonald  
VP: William M Spencer  
Sec-Treas: Ronald Bailey  
GATEWAY MINES, Gateway, undergr.,  
U<sub>3</sub>O<sub>8</sub>  
Prod: 25 tons  
(See Calif)

PACIFIC URANIUM MINES CO  
1924 White, Grand Junction

Pres: B Silbert  
Sec-Treas: T Kubok  
Ch Geol: R Redmond  
(See N Mex)

PAGO MINING CO  
Crested Butte  
BELL GROUP - WINDY-DAY GROUP,  
Lower San Miguel, Head of Big Crys  
Valley, undergr., U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Under devel  
(Branch of Park City Consol Mines)

PANDORA METALS INC  
1555 Dayton St, Aurora  
COMSTOCK & PANDORA MINES,  
Boulder County, Au  
Idle

PARK CITY CONS MINES CO  
39 Broadway, Rm 3007, New York 6

Pres & Treas: Carl Steble  
VP: J L Chadwick  
Sec: George C Maw

KEYSTONE MINE, Crested Butte,  
20 mi N of Gunnison, undergr., Zn,  
Pb, Cu, Ag  
Gen Mgr: Nolan Probst

Geol: F T Steble  
250 TON PLOT MILL, Crested Butte  
(Operated by Amer Smelt & Refin Co,  
see Utah)

PARKER MNG & DEVEL CO  
421 Glenwood Ave, Grand Junction

Pres: Pierre Parker  
BEAN PATCH MINE, Slick Rock,  
undergr., U<sub>3</sub>O<sub>8</sub>  
Gen Mgr: Earl B Murray

PASSIFLORA MNG CO  
P O Box 748, Canon City  
Pres: Charles A Biley  
VP & Gen Supt: M H Taylor  
Met: Marie N Shaw  
Sec: J D Blunt  
PASSIFLORA MINES, 1 1/2 mi N  
of Westcliffe, undergr., Ag, Pb, Cu,  
Au, U<sub>3</sub>O<sub>8</sub>  
Under devel

PASTORE, JAMES

1946 Walnut St, Boulder  
CONGER FLOAT BED, WO<sub>3</sub>  
Idle

PATTERSON, JAMES L  
Durango  
U<sub>3</sub>O<sub>8</sub> Prod

PENROSE URANIUM CO

701 Midland Savings Bldg, Denver  
Pres: F W Rose  
Treas: A C Boson  
URANIUM CLAIMS, various parts  
of Colo  
Under devel  
(See Utah)

PERINI MNG CO  
215 N 8th, Grand Junction  
Under devel

PETTIGREW, WORLEY &  
REYNOLDS MNG CO  
230 W Avery St, Dallas, Texas  
U<sub>3</sub>O<sub>8</sub> Prod

PHILLIPS, CLAYTON E  
P O Box 1175, Rifle  
U<sub>3</sub>O<sub>8</sub> Prod

PINNACLE EXPLORATION,  
INC

10 Park Ave, New York 17

Pres: P D Wilson

VP: J T Hall

Sec: A E Davidson

Treas: E A Salo

AKRON MINE, White Pine

Idle

INDIAN CREEK PROSPECT, Gunnison,  
undergr., U<sub>3</sub>O<sub>8</sub>  
Gen Mgr: J E Dunn

Gen Supt: R J Flynn

Geol: Dr Arthur Baker III

Under devel

(See NY)

POLAND & POLAND  
P O Box 357, Grand Junction  
U<sub>3</sub>O<sub>8</sub> Prod

PORTER & CO  
P O Box 554, Durango  
U<sub>3</sub>O<sub>8</sub> Prod

PRairie DIVIDE URANIUM  
CO

231 S Grant Ave, Fort Collins  
Pres: T H Sackett  
VP: Jas H Andrews  
BLACK HAWK #1 & #2, Fort Collins,  
undergr., U<sub>3</sub>O<sub>8</sub>  
Idle

PRIDE OF THE WEST, INC

Box 422, Silverton  
Agent: C Leslie Larson

PRIDE OF THE WEST MINE, San  
Juan County, Zn, Pb, Ag, Au

PRIME, GEO & JOHNSON  
BROS

Hederland  
HOOSIER MINE, Boulder County,  
WO<sub>3</sub>  
Idle

PYRAMID URANIUM LTD  
600 Rodd Ave, Grand Junction  
Gen Part & Gen Mgr: K Dean Butler  
Geol: Fred C Holmes  
(See Utah)

RADIUM HILL URANIUM

Nye Bluff, Montrose  
Pres & Gen Mgr: Homer Hobbs  
VP: Willard Leighton  
Sec: Corwin Palmer  
(See Utah)

RAINBOW PLACER, INC  
2644 Dupont St, Denver

Pres: Dan C Harrington

VP: R V Section

Sec: Martha V Keene

PLACERS, Tim Cup, Gunnison Cty,

Au, Ag  
Idle

REALTY URANIUM & MNG  
CO, THE

937 U S Nat'l Bank Bldg, Denver 2

Pres: Frederick W Hand

Sec: David J Clarke

Treas: Chandler Weaver

CALHOUN GROUP, WOOD, BEZANT  
MINES, Box 186, Central City,  
Gilpin County, undergr., Au, Ag, Cu,  
Pb, U<sub>3</sub>O<sub>8</sub>

Sup: Henry Ross

Eng: Ray A Bennett

Idle

(See Utah)

REED, GORDON

Naturita

U<sub>3</sub>O<sub>8</sub> Prod

RESURRECTION MNG CO  
(Subsidy of NEWMONT MNG CORP)

Box 936, Leadville

Pres: Fred Sears, Jr

Sec: John E D Gronow

Treas: W P Schmid

IRENE & JULIA FISK MINES, undergr.,

Pb, Zn, Cu, Ag, Au

Agt: John S Wise

Idle

(See NY & Newmont Mng Corp, NY)

MINING WORLD

Colorado

- REY URANIUM CORP**  
Box 1238, Farmington, N Mex  
Pres & Gen Mgr: R J Scanlon  
**ADAK & EQUINOX MINES**, Uravan,  
undergr., U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Mine Supt: Stan Reed  
Prod: 60 tons  
(See N Mex)
- REYNOLDS MINERALS CORP**  
1028 1st Nat'l Bank Bldg, Denver 2  
Pres: D J Luchhurst  
VP & Gen Mgr: G C Ridland  
**JO REYNOLDS MINE**, Lawson,  
undergr., Ag, Pb, Zn  
Gen Supt: Alexander H Balde  
Geol: C K Cugel  
100-TON PLOT MILL, Dumont  
SMELTER, Leadville  
Idle  
(See N Y)
- REYNOLDS MNG CORP**  
Poncha Springs  
MINE undergr. & surf, fluor spar  
MILL  
Idle  
(See Ark, Va)
- REYNOLDS TUNGSTEN CORP**  
1036 1st Nat'l Bank Bldg, Denver 2  
**DOZIER MINE**, Lawson, WO<sub>3</sub>  
Gen Mgr: G C Ridland  
Idle  
**GRAV MILL**
- RICO ARGENTINE MNG CO**  
217 Kearns Bldg, Salt Lake City,  
Utah  
Pres: Sherman B Hinckley  
Vt: J C Johnson  
Sec: L L Lovvill  
Treas: B B Hall  
Purch Agt: Sherman B Hinckley  
**MT SPRINGS & ARGENTINE MINES**,  
Box 7, Rico, undergr. open pit.  
pyrite, Pb, Zn, Ag  
Gen Mgr: Sherman B Hinckley  
Mine Supt: Paul Bosschart  
Mine Frm: B F Leber, Ralph  
Van Arsdale  
Assayer: Charles Tuller  
150-TON PLOT MILL, at mine  
Mill Supt: Bill Murphy  
Assayer: Charles Tuller  
1,000-TON PYRITE BENEFIC PLANT  
at mine  
500-TON SULPHURIC ACID PLANT  
at mine  
(See Utah)
- ROBINSON, ELBERT C**  
Livermore  
**ROBINSON RANCH MINES**, undergr.  
U<sub>3</sub>O<sub>8</sub>  
Prod: 1 ton
- ROCKY MOUNTAIN MILL &  
CHEM CO**, (formerly ROCKY MOUNTAIN  
STANDARD, INC)  
Box 187, Boulder  
Pres: Howard J Anderson  
Vt: Hugh Bolinger  
Sec-Treas: Charles E Williams  
Chmn of the Bd: Harry Culver  
**JOHNSON-WESTLAND MINE**  
URANIUM UPGRADERS & OIL  
OPERATORS  
Under devel
- ROSARIO EXPLORATION CO**  
212 Electric Bldg, Grand Junction  
Pres: R M Raininger  
VP: H S Anderson  
Sec-Treas: G E McDaniel  
Geol: Warren E Owe  
Explor  
Subsidy of New York and Honduras  
Rosario Mng Co)
- ROYAL MNG & MLC CO**  
90 Main and Harrison, Loveland  
c/o Paul H Adams  
**COWDREY MINE**, Boulder City, WO<sub>3</sub>
- SABRE - PINON CORP**  
103 Bohum Bldg, Santa Fe, N Mex  
Pres: R D Bohum, II  
VP: W R Montgomery  
Sec: George Slover, Jr  
Treas: Hugh M Craigie  
**URANIUM PROPERTIES**, Bull Canyon  
dist, Montrose & San Miguel Counties,  
Beaver Mesa, Gateway dist, Mesa  
City  
Explor  
(See N Mex)
- ST ANTHONY URANIUM CORP**  
P O Box 1798, Grand Junction  
Pres: Frank Coolbaugh  
VP & Gen Mgr: A M Mastrovich  
Sec: John P Fitz-Gibbon  
Treas: Thomas E Congdon  
**URANIUM EXPLORATION**, N Mex  
(See N Mex)
- S T REGIS URANIUM CORP**  
1265 S Jackson St, Denver  
Pres: E B Brusman  
VP: Thomas Kornis  
Treas: Neil Horan  
Sec: T K Brannan  
**LONE PINE MINE**, Montrose City,  
undergr., U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Gen Mgr: E B Brannan  
Mine Supt: Delbert Dyer, Lessee  
Prod: 15 tons
- GEORGE H SAGER**  
525 Cheyenne Blvd  
Colorado Springs  
**MINE**, Boomer Lodge, Park City, beryl
- SALLY BARBER MNG CO**  
Montezuma  
Gen Mgr: Mike Vinson  
Asst Mgr: Pat Vinson  
**CHAUTAUQUA MINE**, 5 1/2 mi SW  
of Montezuma, undergr., Pb, Ag, Cu  
Mine Supt: Fred Harris  
Mine Eng: Bill Kejzy  
Prod: 25 tons  
60-TON PLOT MILL, Montezuma  
Mill Supt: Mike Vinson  
Assay: W H Smith  
Under devel
- SAMSON URANIUM, INC**  
901 Sherman St, Denver  
Pres: John A Alderman  
VP: Vincent Schmid  
Sec: Milton Berger  
Treas: Robert T Martin  
Purch Agt & Gen Mgr: Tom E Martin  
(See Utah)
- SAN JUAN LEASING CO**  
c/o Grover Williams, Uravan  
U<sub>3</sub>O<sub>8</sub> Prod
- SAN JUAN MNG & DEVEL CO**  
Nederland  
Pres: Chas H Turner  
VP: Philip F Icke  
Sec: Sam D Walter  
**SAN JUAN MINE**, Ophir undergr. Cu,  
Ag, Pb, Au  
Gen Supt: Randolph Belisle  
Geol: Dr G C Ridland  
Prod: 75 tons, from devel only  
Under devel  
(Under lease to Cataract Mng Co)
- SAN MIGUEL URANIUM INC**  
330 N 3rd St, Grand Junction  
U<sub>3</sub>O<sub>8</sub> Prod
- SESAME MNG CO**  
330 1/2 Main, Grand Junction  
Under devel
- SHATTUCK DENN MNG CO**  
Box 970, Uravan  
Gen Mgr: Thomas W Newell  
Gen Supt: Frank W Garrett  
Purch Agt: Jack D Hill  
**SHATTUCK DENN MINE**, undergr.  
U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Prod: 70 tons  
(See Ariz, N Y)
- SHIPROCK INDUSTRIES, INC**  
3000 Main St, Tulsa,  
Tulsa, Okla  
Pres: F T Anderson  
VP: Neil W Stalheim  
Sec-Treas: W G Clinchy  
MINE, Box 481, Boulder, undergr.  
WO<sub>3</sub>  
Mine Supt: George Jump  
Under devel  
(See N Mex)
- SHUMWAY, LARRY & BOB**  
M, ab, Utah  
U<sub>3</sub>O<sub>8</sub> Prod
- SERRA ANCHA MNG CO**  
740 Main St, Grand Junction  
(See Ariz)
- SILVER BELL MINES CO**  
633 Guaranty Bank Bldg, Denver 2  
Pres & Gen Mgr: E H Sanderson  
VP: E J Nord  
Sec: Jack O Brown  
**SILVER BELL & CARBONERO MINE**,  
Ophir, undergr., Au, Pb, Ag, Cu  
Gen Supt: Lesley E Smith  
Idle
- SILVER BULL MNG**  
771 S Santa Fe, Pueblo  
BIG POUR, Summit County, Au  
Under devel
- SILVER KING MNG & MLC  
ENTERPRISES**  
c/o R L Kahl, 11937 E Colfax Ave,  
Aurora
- BRIGHTON DUMP**, Clear Creek Cty,  
Ag, Pb, Zn
- SILVER KING MILL**  
Idle
- SILVER SHIELD MNG & MLC  
CO**  
704 Newhouse Bldg, Salt Lake  
City 1, Utah  
Pres: Mary Kyte Ellsworth  
VP & Gen Mgr: L E Stein  
Sec: Samuel Bernstein  
Gen Supt: Phil W Page  
MINE, Box 544, Ouray  
Idle
- 250-TON CUSTOM PLOT MILL**  
(Leased)
- SKALLA, A F**  
Uravan  
Gen Mgr: A F Skalla  
**MONOGRAM MINES**, 30 mi S of  
Uravan, undergr., U, V  
Frnt: J R Skalla  
**PAWN SPRINGS MINE #2 & 12**,  
undergr., U, V  
**ANNA MAY & DOG TAIL MINES**,  
Montrose County, U
- SKIDMORE MNG CO**  
Box 558, Dolores  
Pres: T H Skidmore  
VP: G H Skidmore  
Sec: H S Pack  
**LEGIN GROUP**, undergr. U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Asst Gen Mgr: A L Skidmore  
(See Utah)
- SLAUGHTER EXPLORATION CO**  
9 Main St, Evansville, Ind  
MINE, Box 343, Dove Creek, 15 mi  
SW of Dove Creek  
Mine Supt & Purch Agt: W Barbre  
Under devel
- SMART, O E**  
Naturita  
U<sub>3</sub>O<sub>8</sub> Prod
- SMITH & RUDD**  
Nederland  
**RAMBLER MINE**, Boulder County,  
WO<sub>3</sub>  
Idle
- C H SMITH**  
2000 Marine St, Boulder  
**QUAKER MINE**, Boulder Cty, WO<sub>3</sub>
- SMUGGLER MNG CO**  
George town  
**SMUGGLER MINE**, Clear Creek  
County, Au  
Idle
- SOUTH MT MNG CO**  
c/o Frank E Siegfried,  
447 Washington St, Monte Vista  
**GOLD LINKS MINE**, Rio Grande  
County, Au  
Idle
- SOUTHWESTERN OIL &  
URANIUM**  
El Rio Rancho Motel, Grand  
Junction  
U<sub>3</sub>O<sub>8</sub> Prod  
Under devel
- SPRAY, EDWIN C**  
1537 Washington St, Denver 3  
**SWEET HOME MINE**, Alma, undergr.,  
Ag, Cu, Pb  
Under devel
- SPRING DAY MNG CO**  
Box 395, Central City  
Pres & Gen Mgr: William E Landen  
Sec-Treas: James R Austin  
**DAY SPRING & SPRING DAY MINES**,  
1 1/2 mi SW of Central City near  
head of Leavesworth Gulch, undergr.  
Geol: Niles Grosner  
Mine Supt: William E Landen  
Asst Mine Supt: Garry Danko  
Under devel
- 42-TON PLOT GRAV MILL**, lower  
Russell Gulch  
Idle
- SPRINGER, D P**  
Naturita  
U<sub>3</sub>O<sub>8</sub> Prod
- STAATS & NIGHTOWER**  
Naturita  
U<sub>3</sub>O<sub>8</sub> Prod
- STANDARD URANIUM CORP**  
354 South 4th East, Moab, Utah  
Pres & Gen Mgr: Wm R McCormick  
VP: Mitchell Mellich  
Sec-Treas: J Newton Brown  
Purch Agt: James E King
- MICAWBER MINE**, Created Butte,  
undergr., Pb, Zn, Ag  
Asst Gen Mgr: Russell L Wood  
Geol: Robert R Ward  
Mine Supt: Jack H Dressel  
Mine Eng: Charles Carpenter  
Under devel
- 130-TON PLOT MILL**, at mine  
Under const
- MICKEY BREEN & MTN MONARCH  
PROPERTIES**, Ouray  
Mine Frm: Harry J Jordan  
Under devel  
(See Utah)
- STERRY BROTHERS**  
Merker  
U<sub>3</sub>O<sub>8</sub> Prod
- STEWART, JAMES**  
Egnar  
U<sub>3</sub>O<sub>8</sub> Prod
- STRATEGIC MINERALS  
EXPLOR CO**  
P O Box 1648, Grand Junction  
Managing Part: John C Schumacher  
Oil & Met Dept: H C Anderson  
**URANIUM EXPLOR**, Red Canyon,  
East Canyon & LaSal Creek  
Under devel
- STRATTON CRIPPLE CREEK  
MNG & DEVEL CO**  
Box 178, Colorado Springs  
Pres: D P Stricker  
VP: H L Stubbs  
Sec-Treas: Kenneth Brown  
Supt: James H Kremer  
MINES, under lease
- STURM MINING CO**  
Rt 12, Box 2334, Grand Junction  
Pres & Gen Mgr: Fred Sturm  
VP & Purch Agt: Leona Sturm  
Sec-Treas: Don K Sturm  
Mech Eng: Wesley Sturm  
Safety Eng: Lewis Sturm  
**ELIZABETH GROUP**, Mesa Creek,  
8 mi SW of Grand Junction, sur-  
face, U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>
- SUPERIOR MINES CORP**  
Salida  
Gen Mgr: James Foster-Smith  
**ANTORO MINE**, Box 387, Salida,  
undergr., Au, Ag, Pb, Zn, Cu  
Idle  
(Leased to W E Burleson)
- SUSAN B URANIUM CORP**  
34 Prospectors Lodge, Moab,  
Utah  
MINES, undergr., surface, U<sub>3</sub>O<sub>8</sub>,  
WO<sub>3</sub>  
(See Ariz, Utah, Wyo)
- SYLVANIA MNG & MLC CO**  
111 Security Bldg, Denver  
**GOLDEN ROSE MINE**, La Plata  
County, As
- TALL TIMBER MNG CO**  
c/o L R Human, 800 Grant St,  
Denver  
MINE, near Indian Hills, feldspar,  
Ba, Mica, U<sub>3</sub>O<sub>8</sub>  
Under devel
- TALLAHASSEE URANIUM  
CORP**  
P O Box 768, Canyon City  
U<sub>3</sub>O<sub>8</sub> Prod  
Idle
- TANTALIZER MNG CORP**  
2124 Edgewater Dr, Albany, Ga  
**TANTALIZER MINE**, Fremont  
County, Co  
Under devel
- TECH SER MNG CO**  
Box 517, Silverton  
**LUCKY JACKS GROUP**, OSCEOLA  
**SILVER LEDGE**, San Juan County,  
Ag, Pb, Zn  
Under devel
- TERMINAL EXPLOR CO**  
510 Rood Ave, Grand Junction  
Under devel
- TEXAS - ZINC MINERALS  
CORP**  
620 Rood Ave, Grand Junction  
Mgr: A L Hayes  
Mine Ctr: R E Radkebaugh  
Head of Explor: A E Douthit  
(See Utah)

**Colorado**

**THOMPSON, WARREN BARRY,**  
P O Box 1837, Denver  
**GOLD DUST GROUP & INDEPENDENCE MINE,** Boulder County,  
undergr., Au, Ag, Cu  
Under devel  
(See N Mex, Utah)

**THORNBURG MNG CO**  
140 W Main, Grand Junction

**THORNBURG URANIUM MINES, INC.**  
180 W Main St, Grand Junction  
Pres: Vance Thornburg  
VP-Sec: Garth Thornburg  
Off Mgr: Terry E Weldon  
LOS OCHE PROP, Gunnison County,  
U<sub>3</sub>O<sub>8</sub>  
Producing  
(See Utah)

**THUNDERBIRD URANIUM CO**  
P O Box 1665, Salt Lake City,  
Utah  
U<sub>3</sub>O<sub>8</sub> Prod  
(See Utah)

**TORRES, DAVID**  
Monticello, Utah  
U<sub>3</sub>O<sub>8</sub> Prod

**TRACE ELEMENTS CORP**  
(UNIT OF UNION CARBIDE NUCLEAR CO)  
Box 1135, Grand Junction  
Pres: Bruce Brownson  
VP: C L Walker  
Sec: B A Kellogg  
**MAYBELL MINE & MILL,** Maybell,  
surface, U<sub>3</sub>O<sub>8</sub>  
Gen Mgr: R C Cutler, Gen E Morehouse  
Mine Supt: I R Taylor  
Plant Supt: K W Lentz  
Geol: J D Shaw  
Met (Consult): John L Chapman  
Frm: Don H Seelye

**TRANS-MOUNTAIN URANIUM CO, INC**  
3340 Hwy 24, Colorado Springs  
Pres: S P Balcomb  
VP: Ray L Benham  
Sec: M P Balcomb  
Treas: Howard M Gray  
Council: R B Murray  
Dir: J A Garber, C H Long,  
R D Prigmore  
**DENHAM MINE, LINDY POINT UNIT,**  
Gateway, undergr., surface, U<sub>3</sub>O<sub>8</sub>, V  
Gen Mgr: S P Balcomb  
Asst Gen Mgr: Clyde H Long  
Gen Supt: Ted Booth  
Asst Supt: Charley Naught  
Under devel

**TREASURE MOUNTAIN GOLD MNG CO**  
208 Midland Savings Bldg, Denver 3  
Pres: Guy L V Emerson  
Sec: A W Fischer  
**SANDIAGO, SAN JUAN, QUEEN, GOLDEN FLEECE & SCOTIA MINES,** 11 mi NW of Silverton, undergr., Au, Ag, Pb, Zn, Cu  
Under devel

**TREASURY VAULT URANIUM CORP**  
718 Symes Bldg, Denver  
Pres: Ben L Wright, Jr  
VP: LeRoy A West  
Sec: David J McKee  
Treas: Delbert R Peterson  
Gen Mgr & Purch Agt: Robert R Hale  
Eng: John G Freeman  
**CHAMPAGN & CONEY MINES,** Fairplay, undergr., U<sub>3</sub>O<sub>8</sub>  
Under devel

**TRI - EM CORP**  
Main Ofc: 524 Cooper Bldg, Denver 2  
Oper Ofc: Box 105, Villa Grove  
Pres: O R Cunningham  
**CLIFF & JUPITER MINES,** Villa Grove, Au, Pb, Cu  
Gen Mgr: D W Schmitt  
Asst Gen Mgr: Joe Cunningham  
Mine Supt: F W Burger  
**50-TON FLOT GRAV MILL,** Bonanza, Kerber Creek dist  
Mill Supt: Clinton C Anderson  
Assayer: John DeVall  
Under devel

**TRIPLE "O" URANIUM MNG CO**  
Aspen  
Pres: William C Orscheln  
VP: Frank Westlake  
Treas: Donald W Orscheln  
Gen Mgr & Purch Agt: Edwin C Arthur  
(See Utah)

**LONGNECKER MINE,** Ashcroft,  
undergr., Pb, Ag, Cu, Au  
Mine Supt: E W Arbar  
Idle

**TUNGSTEN MNG CO, INC**  
420 Pine St, Boulder  
Pres & Treas: George W Cowdry  
VP & Sec: William D Cowdry  
**TUNGSTEN MINE,** Boulder, undergr.,  
U<sub>3</sub>O<sub>8</sub>  
Prod: 155 tons in 1957

**TURNER, JACK C**  
P O Box 58, Moab, Utah  
U<sub>3</sub>O<sub>8</sub> Prod

**TWIN ARROW PETROLEUM CO**  
1st Nat'l Bank Bldg, Denver  
U<sub>3</sub>O<sub>8</sub> Prod  
Under devel

**UNAWEEP C C & H EXPLOR CO**  
Whitewater  
Pres: Jerome Craig, Sr  
VP: Don Cox  
Sec: Jerome Craig, Jr  
Treas: Herschel Hendrickson  
Purch Agt: Ralph Craig  
**MINES,** Whitewater, undergr., open  
pit, placer, V<sub>2</sub>O<sub>5</sub>, U<sub>3</sub>O<sub>8</sub>  
Hills  
Mills, Uravan

**UNCOMPAGRE URANIUM, INC**  
Box 114, Grand Junction  
Pres: John Gaskill  
VP: Ken Weaver  
Sec-Treas: John Horan  
**DEER TRAIL MINE,** Fawn Creek,  
22 mi E of Meeker, undergr.  
Supt: Ken Weaver  
Under devel

**UNION CARBIDE NUCLEAR CO;**  
(A Div of UNION CARBIDE & CARBON CORP)  
Electric Bldg, Grand Junction  
Gen Mgr Colo Plateau: J L Lakes  
Mgr of Plants: J F Brenton  
Asst Mgr of Plants: H K Jackson  
Mgr of Eng: R E Barnes  
Mgr of Act & Finance: C P Martin  
Ch Geol: J E Motica  
Mot: D C Seidel  
**MINE & MILL,** Uravan, undergr.,  
U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Mine Supt: J B Borden  
Mill Supt: J M Chandler  
Plant Supt: A C Sade  
**MINE & MILL,** Maybell (Trace Elements Corp Unit), open pit, U<sub>3</sub>O<sub>8</sub>,  
V<sub>2</sub>O<sub>5</sub>  
Mine Supt: I R Taylor  
Plant Supt: K W Lentz  
**MINE & MILL,** Slick Rock, U<sub>3</sub>O<sub>8</sub>  
Plant Supt: J P Sanders  
Mine Supt: W H Witt  
**CHEMICAL MILL,** Rifle  
Plant Supt: C H Peterson  
Asst Plant Supt: J W Lane  
Mill Supt: M M Brennan  
(See Calif, NY, Utah)

**UNION GULF OIL & MNG CORP**  
2701 U S Hwy 50, Grand Junction  
ST JOHN SILVER MINE, near  
Montezuma, Summit County  
CLAIMS, Saguache County  
Idle  
(See Utah)

**UNITED GOLD MINES CO**  
Box 127, Cripple Creek  
Pres: M E Shoup  
VP & Gen Mgr: Max W Bowes  
Gen Supt: C H Carlton  
**VINDICATOR & PORTLAND MINES,** Victor, undergr., Au, Ag

**U S GYPSUM CO**  
300 W Adams St, Chicago 6, IL  
QUARRY, Loveland, gypsum, open  
pit  
Work Mgr: J R Miner  
(See Calif, Conn, Ill, Ind, Iowa, Mass,  
Mich, Mont, Nev, N Mex, N Y, Ohio,  
Okla, Tex, Utah, Va)

**U S LITHIUM CORP**  
1305 Walker Bank Bldg, Salt Lake City, Utah  
**BROWN DERBY & TUCKER MINES,** Gunnison County, undergr., lepidolite, spodumene  
Gen Mgr: Paul T Walton  
(See Utah)

**U S SOIL CONDITIONING CO**  
Rainbow Bldg, Box 346, Salida  
Pres: J H Lionel  
TUMBLE MOUNTAIN, surface,  
Idle

**UNITED URANIUM CORP**  
1408 Broadway, Denver 2  
Pres: Ray Fahrlander  
VP: Edgar Payne  
Sec-Treas: R H Foster  
**HOT DRILL #1 & PICO #3 MINES,** Dove Creek, U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Under devel (lease agreement)

**UNIVERSAL OIL & URANIUM CO**  
7800 W Colfax Ave, Lakewood  
**RED ELEPHANT GROUP,** Clear Creek County, Ag, Pb, Zn  
Under devel

**URANIUM CORP OF AMERICA**  
Box 28, Los Alamos, N Mex  
FIELD OFFICE, Cortes  
CLAIMS, Dolores County, Rico area  
Under devel

**URANIUM DEVEL CORP**  
Golden  
Mgr: Paul Keating  
U<sub>3</sub>O<sub>8</sub>, Under devel

**URANIUM ENTERPRISES**  
2679 Arapaho, Boulder  
Gen Mgr: Elliot Goldstein  
**MANN #1 MINE,** Morrison, undergr.,  
U<sub>3</sub>O<sub>8</sub>  
Mine Supt: Tom Geter  
Prod: 20 tons

**URANIUM EXPLORERS SYNDICATE**  
645 Emerson St, Denver  
Gen Mgr: J B Field  
URANINITE, CORVISITE claims  
in Mesa and San Miguel counties  
Under devel

**URANIUM INDUSTRIES INC**  
132 S 4th, Grand Junction  
(See Utah)

**URANIUM METALS, INC**  
Eggar  
**FALCON URANIUM MINE,** Bishop Canyon, Montrose County, Ch Eng: Dr A Zangara  
U<sub>3</sub>O<sub>8</sub> Prod

**URANIUM PRODUCERS, INC**  
Eggar  
Mgr: Harry E Coplin  
**URANIUM MINE,** Slick Rock dist, Montrose County

**URANIUM PROSPECTORS CO, LTD**  
718 N St, Grand Junction  
U<sub>3</sub>O<sub>8</sub>, Under devel

**URANIUM QUEEN EXPLOR CO**  
622 1/2 16th St, Greeley  
**URANIUM QUEEN MINE,** Larimer County, U<sub>3</sub>O<sub>8</sub>  
Mine

**UTACO URANIUM CORP**  
Box 13, Moab, Utah  
**BRADLEY MINE,** San Miguel County, Ag, Pb, Zn  
**SILVER SHIELD MILL,** Ouray  
Under devel

**UTARADO MNG CO**  
P O Box 287, Montrose  
U<sub>3</sub>O<sub>8</sub> Prod

**UTCO URANIUM CORP**  
310 1st Nat'l Bank Bldg, Denver  
Pres: Geo S Casey  
VP: Fred C Clymer  
Sec: H Clark Thompson  
Treas: John Alf  
Asst Treas: J D Vander Ploeg  
Gen Mgr & Geol: Mason W Rankin  
(See Ariz, N Mex, Utah)

**UTIDA CO**  
P O Box 58, Moab, Utah  
U<sub>3</sub>O<sub>8</sub> Prod

**VANADIUM CORP OF AMER**  
Durango  
VP & Gen Mgr: D W Vilis

**VANADIUM QUEEN PERSONNEL**  
Dir of Plateau Oper: Page Edwards  
Geol: E E waulers  
Master Mech: C T Newland  
Mine Eng: Wm W Wittmeyer

Lab Supt: Roland G Vesper  
Shop Frm: Kenneth Erickson  
**NATURITA PERSONNEL**  
Geol: Jack L Benham, Hilary Tanner  
Mine Supt: R L Anderson  
Master Mech: Frank Sell  
Ch Chemist: William Kyle  
MILL, Durango, roast leach  
Mill Supt: J A Maxwell  
Asst Mill Supt: Dale Prior  
MILL, Naturita, roast leach  
Mill Supt: L A Daniels  
Asst Mill Supt: C Don King  
(See Ariz, N Mex, N Y, Utah)

**VANADIUM QUEEN URANIUM CORP**  
P O Box 1674, Grand Junction  
Pres: Don Danvers  
Sec-Treas: Dick Harrison  
**VANADIUM QUEEN MINE,** La Sal Creek, undergr., U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Res Eng: John I Schumacher  
Prod: 25 tons  
(Oper under contract to Joe Pitts, 133 W Mesa, Grand Junction)

**VANURA URANIUM, INC**  
Marshall Court, Moab, Utah  
VP: Ellis R Cook, Jr  
Field Supervisor: Everett Blackburn  
**QUARREL MINE,** Bull Canyon, Montrose County, undergr., U<sub>3</sub>O<sub>8</sub>  
V<sub>2</sub>O<sub>5</sub>  
Mine Supt: Lee Elder  
**CROWN PRINCE,** Martin Mesa, Montrose County, undergr., U<sub>3</sub>O<sub>8</sub>  
(See Utah)

**VICON INC**  
Colorado Springs  
Pres: E W Hayes  
VP-Gen Mgr: H S Carter  
Sec-Treas: L H Snyder  
Contr: R J Jenkins  
**DXIE #4 MINE,** Clear Creek County, All  
Gen Mgr: F J Dyer  
**75-TON MILL,** Idaho Springs  
Mill Supt: Cecil Young

**VILLA GROVE TURQUOISE MINE**  
Villa Grove  
LODE, Saguache County, Turquoise

**VOGEL URANIUM MINE & EXPLOR CO**  
Box 318, Amarillo, Texas  
Purch Agt: Harold W Vogel  
**BLUE BONNET NO 5 MINE,** Lake City, undergr., Au, Ag, Zn, Bonite, U<sub>3</sub>O<sub>8</sub>  
Gen Mgr & Mine Supt: Harold W Vogel  
Asst Gen Mgr: Harold H Ham  
Under devel  
(See N Mex)

**W A H CHANG CORP**  
Box 441, Boulder  
**50-TON GRAY MILL,** Sugar Loaf Road, Boulder  
Rep in Charge: Earl G Sweeney  
**60-TON FLOT GRAY MILL,** Sugar Loaf Rd, Boulder  
(See Calif, Nev & E Ariz & J H Casier, Ariz)

**WALKER ENGINEERING CORP**  
612 Dooly Bldg, Salt Lake City, Utah  
**HAP HAZARD MINE,** Lake County  
All  
(See Idaho, Utah)

**WATTERS, MARION R**  
Rte 1, Dolores  
U<sub>3</sub>O<sub>8</sub> Prod

**EUSTACE W WEBB**  
Box 457, Boulder  
**OPHIR MINE,** Boulder County, WO<sub>3</sub>

**WESTERN FELDSPAR MLG CO**  
Box 811, Salida  
Sec-Treas: J W Magnuson  
PLANT, near Salida, feldspar  
Under devel

**WESTERN GOLD & URANIUM, INC**  
Box 158, St George, Utah  
**RITO SECO MINE,** San Luis, Au  
Idle  
(See Ariz, Utah)

**WESTMINSTER CORP**  
410-20 1st Nat'l Bank Bldg, Denver  
Pres: David W Adams  
VP: Melvin C Bowles

**MINING WORLD**

VP & Treas: Jim T Holman  
ROC CREEK CLAIMS, Roc Creek  
dist., U.S.  
MINES, Black Rock Dist., U.S.  
(See Ariz., Nev., Utah, Wyo.)

WILLIAMS MINING CO  
Norwood  
U<sub>3</sub>O<sub>8</sub>

C K WILLIAMS  
2001 Lynch Ave., East St Louis,  
Illinois  
Gen Prod Mgr: T J Stewart,  
Ophir, Colo  
IRON SPRINGS PLACE, crude  
iron oxide pigment materials

WORCESTER MINES  
1501 White Ave., Grand Junction  
MINE, near Uravan, undergr.,  
U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Mng Part: John W Hill  
Frnr: Paul R Martin  
Shft Boss: Joe G Steckler

WRIGHT BROTHERS  
Uravan  
PROD CLAIM, Uravan area, U  
(Leased to US Vanadium)

WRIGHT, WARREN  
Rt 4, Grand Junction  
MINE, 65 mi SW of Grand Junction,  
undergr., U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>

WYCOL MINERALS INC  
Saguache  
U<sub>3</sub>O<sub>8</sub>  
idle

YANKEE CANUCK URANIUM  
CORP  
201 N 5th, Grand Junction  
Under devel

YANKEE URANIUM CO  
721 Judge Bldg., Salt Lake City,  
Utah  
U<sub>3</sub>O<sub>8</sub>  
Under devel

YELLOW QUEEN URANIUM  
CO  
850 Reed St., Lakewood  
Pres: T J Danaher  
VP: Furnas-Bischoff Berger  
Sec: R E Robinson  
ASCENSION MINE, 5 mi NW Golden,  
undergr., U<sub>3</sub>O<sub>8</sub>  
Geol: Dave Coobough

YOUNG CLAIRBORNE & YOUNG  
3320 N Virginia, Colorado Springs  
U<sub>3</sub>O<sub>8</sub>  
Under devel

ZIMMERMAN, BEN  
1302 Main St., Grand Junction  
U<sub>3</sub>O<sub>8</sub> Prod

ZODOMOK MINES, INC  
Box 452, Durango  
Pres: Karle S Goff  
VP: Kenneth Briseid  
Sec-Treas: Donald M DeLuca  
BESSIE G MINE, undergr., As, Ag  
Prod: 90 tons  
50-TON PLOT GRAV MILL,  
La Plata Canyon  
Mill Supr: Karle S Goff

## CONNECTICUT

U S GYPSUM CO  
300 W Adams St., Chicago 6, Ill  
FALLS VILLAGE MINE, Falls  
Village, open pit, limestone  
Works Mgr: C P Syvahn  
(See Calif., Colo., Ill., Ind., Iowa, Mass.,  
Mich., Mont., Nev., N Mex., N.Y., Ohio,  
Okla., Texas, Utah, Va.)

## DELAWARE

E I DU PONT de Nemours  
& CO  
Pigments Dept., 1007 Market St.,  
Wilmington.  
(See Fla.)

## FLORIDA

### AMERICAN AGRI CHEM CO

Pierce  
MINES, Pierce, Polk County,  
phosphate rock  
Gen Mgr: F R Bergquist  
Gen Supr: J S Gruel  
Mech Eng: H R Quina  
Mine Supr: N M Pealde  
PLOT MILL, at mine  
(See NY)

AMERICAN CYANAMID CO  
30 Rockefeller Plaza, New York 20,  
N.Y.  
Pres: W D Bell  
Sec: W P Starkevast  
Treas: L C Perkins  
Dir of Purch: H K LaRowe  
Mgr of Phosphate Oper: Arthur Crago  
Asst Mgr of Phosphate Oper:  
F L McDonald

Mines Mgr: E H Hayworth  
Devel Supr: J L Wegner  
Mech Supr: W B Anderson  
Met: R C Timberlake  
Elec Supr: H L Davis  
Ch Eng: W J Pace

ORANGE PARK MINE, Brewster,  
Park area, open pit, phosphate  
Mine Supr: F A Vogler  
Prod: 5,500 tons

ORANGE PARK PLOT MILL  
Mill Supr: W F Boyd  
6,200-TON SADDLE CREEK PLOT  
MILL

Mill Supr: W F Boyd  
SYDNEY MINE, Brewster, Acco  
area, open pit, phosphate  
Mine Supr: C B Duke

Prod: 12,000 cu yds Matrix  
3,000 tons phosphate rock

4,400-TON SYDNEY PLOT MILL  
Mill Supr: Grady Barnett  
(See Ark., Ga., Va.)

### ARMOUR FERTILIZER WORKS, INC

Bartow  
MINE, Bartow, phosphate

### CAMP PHOSPHATE CO

Hernando  
Phosphate  
idle

### CONTINENTAL MINERAL PROCESSING CORP

1st Nat'l Bank Bldg., Cincinnati 2,  
Ohio  
Pres & Gen Mgr: Frederick A Hauck

MINE, Brevard County, open pit,  
rutile, ilmenite, zircon

Prod: 70 tons  
(See Ohio)

### CORONET PHOSPHATE CO, A DIV OF SMITH - DOUGLAS CO, INC

Box 790, Plant City  
Pres: R S Rydell  
Sec: W R Mowen

Purch Agt: C W Johnson  
TENOROC MINE, Polk County, near  
Auburndale, open pit, phosphate rock

Gen Mgr: R M Wilbur  
Gen Supr: W H Taylor

Dir Research: C A Hollingsworth

Mine Supr: L G Wood

Mine Eng: E A Sawitske

PLOT MILL at mine, washing &  
screening

Mill Supr: C E Mills

### DAVISON CHEMICAL CO

DAVISON CHEMICAL CO  
A DIV OF W R GRACE & CO

Florida Phosphate Div  
Box 471, Bartow

Gen Mgr: W R Fort

Prod Supr: J D Clary

Mgr, Prod Plan: J H Hunter, Jr

Purch Agt: W W Thornton

Ch Chem: C McDaniel

Ch Eng: A J Frost

Elec Eng: W W Merkel

Geol: E R Scharan

Plant Eng: B W Johnson

Project Eng: C H Greene

Field Eng: L L Kelso

Mines Plan: M P McArthur

Safe Eng: J R Terry

Gen Minr: Supr: D W Jones

Phosphate Rock Maint Supr: E J

Furcell

Triple Maint Supr: D W Flager

Prod: 10,000 tons daily

BONNY LAKE MINE, Bartow, surface,

phosphate

Supr: W A Allen

PAUWAY #4 MINE, Bartow, surface,  
phosphate

Supr: F H Elliott  
Chem Plant Supr: D L Broke  
MILL, Ridgewood  
Mill Supr: C B Blood  
Asst Mill Supr: L L White  
ROTARY KILN & DRYERS  
(See Md.)

### E I DU PONT de NEMOURS & CO

Pigments Dept., 1007 Market St.,  
Wilmington, Del  
HIGHLAND PLANT, (office), Drawer  
A, Lawley, & TRAIL RIDGE PLANT,  
(office) Drawer 673, Starke  
Mgr: Charles A Hager

Met: J C Detweller  
Cont: S I Jackson  
HIGHLAND PLANT, 1 mi E of Lawley,  
open pit, ilmenite

Supr: E S Bebe

Mine Supr: W C Coran

Mine Eng: J L Hetherington

TRAIL RIDGE PLANT, 1 mi E of  
Starke, open pit, ilmenite, zircon,  
staurolite

Supr: W J Sippette

Mine Supr: C J Fendrick

Mine Eng: J F Mulling

GRAV MILL  
(See Del.)

### THE FLORIDA MINERALS CO

DIV OF HOBART BRO CO

Box 1597, Vero Beach

Pres & Gen Mgr: N W Van Ausdal

Purch Agt & Gen Supr: Sterling

Dangler

MINE, Winter Beach, open pit,

rutile, zircon, ilmenite

MILL, at mine

### FLORIDA CO

Tallahassee

MINES, Quincy & Jamieson,

surface, fuller's earth

MILLS

### HEAVY MINERALS CO

4000 N Hawthorne Ave.,  
Chattanooga, Tenn.

Pres: J C Ward, Jr

VP: E B Wyatt

Sect: K L Karr

Treas: R T Ruder

Gen Mgr: H C Laird

COASTAL SANDS DIV MINE, Box

1097, Panama City, placer, rutile,

ilmenite, zircon, kyanite

Asst Gen Mgr: O G Alessio, Jr

Geol: N H Sahr

Proj Eng: G E Aiken

Miner

(See S C, Tenn.)

### HOWARD PHOSPHATE CO

Box 3028, Orlando

Gen Mgr: R M Howard

MINE, Inverness, surface, 300-ton

bucket dredge, soft, colloidal & hard

phosphate

Mine & Mill Supr: W E Marlow

### HUMPHREYS GOLD CORP

Box 5492, Jacksonville 7

VP: J P Wood

JACKSONVILLE PLANT, Box 5492,  
Jacksonville, 6 miles E of Jacksonville,  
placer, ilmenite, rutile,

zircon, monazite

Mgr: F McKinley

Supr: H Lewis

Asst Supr: A D Whisler

Eng: J Eledge

Cont: S L Jackson

(See Colo.)

### INTERNATIONAL MIN & CHEM CORP

PHOSPHATE MIN DIV

20 N Wacker Dr., Chicago 6, Ill

Bartow, Fla

NORALYN, Peace Valley

Prod Mgr: F B Bowens

Mgr: E T Casler

Asst Mgr, Prod: H T Loehr, Jr

Asst Mgr, Eng: W O McClinton

(See Ariz., Colo., Ill., Me., Miss.,  
N Mex., N.C., Ohio, Tenn., Va., Wyo.)

### KELLOGG CO

920 Franklin St., Ocala.

PHOSPHATE MINE

Box 608, Ocala

Treas: Taylor Scott

Purch Agt: T D Felton

SEC 18 MINE, Dunnellon, open pit,

hard rock, phosphate

Gen Mgr: D B Kibler, Jr

Asst Gen Mgr: Clarence Camp II

Gen Supr: T D Felton

Mine Supr: N T Farrell

Prod: 300 tons

### LONCALA PHOSPHATE CO

Box 338, High Springs

PHOSPHATE MINE, Fort White Mine

### MAGNET COVE BARIUM CORP

Box 6504, Houston, Texas

MINE, Hinson, open pit, Fuller's

Earth

MILL, 300 tons dry grind

Div Mgr: C L Wilkinson, Jr

Plant Mgr: W C White

Prod Mgr: C F Talbot

(See Ark., Mo., Nev., Texas, Wyo.)

### BUFILE MNG CO OF FLORIDA

111 Broadway, N.Y. 6, N.Y.

Pres: Chas C Norris, Jr

VP: John Ross

Sec: A J Drexel Paul, Jr

JACKSONVILLE MINE, South Jackson-

ville, open pit, rutile, ilmenite, Zr

Prod: 50,000 tons per yr

### BUTILE MNG CO OF FLORIDA

Box 476, Dunnellon

PHOSPHATE MINE

SWIFT & CO

Union Stock Yards, Chicago, Ill

BARTOW PHOSPHATE MINE,

Bartow, open pit, phosphate

Gen Mgr: Howard P Gould

Gen Supr: O D Bowers

Mech Eng: W B Hunt

Elec Eng: H K Young

Mine Supr: J B Grant

Asst Mine Supr: E E McKinney

C W Justice

### UNITED CLAY MINES CORP

Hawthorne

MINE NO 4, open pit

Mine Supr: L F Worley

MILL, at mine

(See Ga., Md., N.J., Tenn., S.C.)

### VICTOR CHEMICAL WORKS

Tarpon Springs, Fla

155 N Wacker Dr., Chicago 6, Ill

Pres: Rothe Weigel

Purch Agt: M E Jones

ELEMENTAL PHOSPHATE PLANT

Plant Supr: E A Holtgrewe

(See Ill., Mont.)

### VIRGINIA - CAROLINA CHEM CORP

Nichols

FLORIDA MNG DEPT., phosphate

Mgr: H L Pascoe

MINES, Clear Springs, Hominy

10,000-TON PLOT MILL

(See Tenn., Va.)

### GEORGIA

### ALBEE - YORK MNG CO, INC

Box 356, Cedartown

Pres & Gen Mgr: S B Albee, Sr

VP: Glenn T York, Sr

Sec: Glenn T York, Jr

Asst Gen Mgr & Treas: S B Albee, Jr

Purch Agt: S B Albee, Jr &

S B Albee, Sr

OREMONT MINE, open pit, Fe

Gen Supr: Joe Allen Baker, Jr

Mine Eng: B W Albee, Jr

Prod: 200 tons

500-TON HEAV MED MILL, Oremont

### AMERICAN CYANAMID CO

West Bldg., Rome

Mgr: A W Montgomery

NEW HOLLAND MINE, Hermitage,

open pit, barite

HOLLOWAY-EASTERLIN MINE,

Andersonville, open pit, barite

Geol: R V Shell

MILL, Adairsville

(See Ark., Fla., N.Y., Va.)

### AMERICAN TALC CO

Chatsworth

Pres: M W Glenn

VP: F T Glenn

Sec: J R Ferrer

SHOP TUNNEL, 3 mi E of Chatsworth,

talc, soapstone

Prod: 200 tons

**Idaho**

Mine Sup't: Charles Franzen  
250-TON MILL, Chatsworth  
Mill Sup't: James Johnston  
Mill Prod: Walk Weaver  
(See Ala.)

**APPALACHIAN MINERALS CO**  
Box 350, Monticello  
VP & Gen Mgr: B C Burgess  
MINE, Monticello, feldspar  
Ch Eng: L L McMurray  
(Subsidiary of Pacific Tin Consol Corp)

**ARRINGTON MNG CO**  
Box 115, Cedarville  
Own: C B Arrington  
MINE, Cedarville, Fe

**BARTON MINES, INC**  
Carterville  
Own: Geo Shropshire  
IRON MINE, Aubrey

**BARTES MNG CO**  
Box 224, Carterville  
Pres: A W Wood  
MINE, Carterville, barite

**CAIN, B R**  
Box 304, Carterville  
MINE, Barite

**CLARK & CONNOR**  
Canton  
MINE, Canton, Fe  
Mile

**CONUTTA TALC CO, THE**  
Box 934, Dalton  
Pres: L F Starr  
VP: L B Farrar  
Sec & Treas: S A Farrar  
Purch Agt & Gen Mgr: Trammell  
Starr  
PORT MINE, 7 mi E of Chatsworth,  
undergr., talc & serpentinite  
MILL, Chatsworth

**COX, J W**  
Carterville  
MINE, Barite

**EMPIRE MICA CO**  
Spruce Pine, NC  
Own: S L & J Phillips & Lin Carpenter  
HARD MINE, near Barnerville

**THE FELDSPAR CORP**  
Box 335, Spruce Pine, NC  
**FELDSPAR CORP MINE**, Monticello,  
open pit, gr feldspar  
Gen Mgr: Carroll Rogers, Jr  
Asst Gen Mgr: P C Coletta  
Gen Sup't: Ralph Hughes  
Met: L L McMurray  
Mine Sup't: Holt Boose  
**FELDSPAR MILL**, Monticello  
Mill Sup't: Henry Norman  
Flot & dry grinding  
Prod: 1,000 tons daily  
(Subsidiary of Pacific Tin Consol Corp)  
(See NC, Tenn)

**GAMMACK MINING CO**  
Cedarown  
Pres: E L Gammack  
BRIN MINE

**GEORGIA MARBLE CO.,  
CALCIUM PROD DIV**  
Talc  
MINE, Talc, Limestone

**GEORGIA TALC CO**  
Chatsworth  
Pres: M Woodward Glenn  
MINE, Talc

**GRAVES & ACREE MNG CO**  
Carterville  
MINE, 2 mi W of Cedarville, Fe  
Idle

**GRAY MILL**

**HALE - GEORGIA MINERALS  
CORP**  
Box 197, Carterville  
VP & Gen Mgr: Harry Stykak  
MINE, Carterville, Fe  
Under dev'l  
MINE, Carterville, Ma  
Mile

**HODGE MINING CO**  
118 W Cherokee Ave, Carterville  
Own: J W Hodge  
Sec: M T Shaw  
**HODGE MINE**, 14 mi W of Carterville, Fe  
Sup't: Clyde Shaw  
Prod: 575 tons  
MINE, Bartow County, surface, Fe

**KINGMAN MINES, INC**  
400 College St, Cedarville  
MINE, on Reynolds Mt between  
Cedarville & Cave Spr  
Mgr: J L Scott

**LADD LIME PRODUCTS CO**  
Carterville  
Exec VP: W W Mimby  
MINE, Bartow County, Lime  
Under devel

**LAKE MNG CO, INC**  
Box 343, Carterville  
MINE, Carterville, Fe

**LIBERTY GOLD MINE**  
4822 Blair Circle, Atlanta 18, NE  
Own & Op: Leonard Martin  
**LIBERTY MINE**, Sugar Hill, undergr.,  
Au, Ag  
Prod: 15 tons  
Under devel

**30-TON PLOT GRAV MILL**, at mine

**THE MILWRIGHT CO, INC**  
P O Box 15634, Houston 28, Texas  
Pres: Max B Miller, Jr  
VP: F A Frank

Purch Agt: R J Jones  
Ch Eng: M M Jameson  
MINE, Atlapulgus, open pit  
150-TON MILL, at mine  
(See Tex)

**MOSTELLER BROS**  
Carterville  
MINE, Carterville, Fe

**NEW RIVERSIDE OCHRE CO**  
Box 370, Carterville  
Managing Part: J R Dellingier  
Asst Gen Mgr: W B Hawkins, Jr  
MINE, River Road, open pit,  
barite, ochre  
Gen Sup't: John Cobb  
Prod: 150 tons

**PACIFIC TIN CONSOL CORP**  
See The Felspar Corp & Appalachian  
Minerals Co

**PAGA MNG CO**  
Carterville  
MINE, Carterville, barite

**POWHATAN MNG CO**  
6721 Windsor Mill Rd, Baltimore 7,  
Md  
Pres: Fred A Mett

**GAY & CORNELIA MINES**, Dillard,  
 asbestos  
Sup't: H M Pitts  
**LANDIS MINE**, Dillard, open pit,  
asbestos  
Mine Sup't: Frank Durleson  
Asst Mine Sup't: Coleman Lyday  
Prod: 20 tons  
Ges Mdl

**SOUTHERN TALC CO**  
Box 278, Chatsworth  
Pres: M Woodward Glenn  
MINE, Chatsworth, talc

**THOMPSON - WEINMAN & CO**  
Carterville

**UNITED CLAY MINES CORP**  
Sanderville  
MINE NO 5, open pit  
Mine Sup't: W J Smith  
Asst Sup't: Roger M Carlson  
MILL, at mine  
(See Fla, Md, N J, Tenn, SC)

**WILLINGHAM LITTLE STONE  
CO**  
318 Healey Bldg, Atlanta  
MINE, Whitestone (large undergr.  
opening) Dolomite

**WOODWARD MINES**  
Carterville  
SHILOH & GEORGIA MINES, Polk  
County, Fe  
Mile

**IDAH0**

**ABELMONN, A G**  
632 Main St, Boise  
BAR PLACER, Ar, Ag

**ABERDEEN IDAHO MNG CO**  
810 Bank St, Wallace, Wallace  
ABERDEEN-IDAH0 GROUP, Bear-  
shene County, Au, Ag, Cu, Pb, Zn

**ABOT MINING CO**  
Box 1010, Wallace  
Pres: Henry L Day  
MINE, undergr., Pb, Ag  
Mile

**ACE URANIUM**  
Logan, Utah  
COPPER QUEEN, GOLDEN COPPER,  
COPPER HILL, Lemhi County,  
Au, Ag, Cu, Pb, Zn

**ALICE SILVER - LEAD MNG  
CO**

Box 480, Wallace  
Pres: O L Jones  
Sec-Treas: H F Magnuson  
Idle

**AMAZON MNG CO**  
Box 372, Coeur d'Alene  
Pres: A E Lundin  
Sec-Treas: Geo M Service  
MINE, in Mist, Au, Cu, Ag  
Idle  
(See Min)

**AMERICAN SILVER MNG CO**  
123 W 4th Ave, Spokane, Wash  
MINE, 1 mi S of Cuban, undergr.,  
Cu, Au  
Under devel by Polaris Mng Co  
(See Wash)

**AMERICAN SMELTING &  
REFINING CO, N W MNG  
DEPT**

Box 440, Wallace  
Mgr: J C Kieffer  
Ass't Mgr: S E Zelenko  
Supt of Mines: W J Coombe  
Supt of Mill: G A Dasher  
Elec Supt: A W Beck  
Mech Supt: S W Ward  
Purch Agt: J P Polla  
PAGE MINE, Pb, Zn, Ag  
Supt: T M Tower  
Ass't Supt: C J Ward  
Pres: Al Young, Richard James  
MORNNG MINE, undergr., Pb, Zn,  
Ag  
Mine Sup't: H H Shook  
Under devel

1,200-TON MILL  
**PRECIO MINE**, Pb, Zn, Ag  
Closed 12-31-58  
JACK WAITE MINE, Duthie, under-  
gr., Pb, Zn, Ag  
Supt: C H Blackwell  
Pres: H F Legault  
240-TON MILL, concentrator  
(Operated under agreement with Jack  
Waite Mining Co)  
GALERIA UNIT, 3 mi W of Wallace,  
undergr., Ag, Pb

Sup't: Norman Vines  
Mine Sup't: G B Christian  
Mine Pres: E Lomas  
350-TON MILL, concentrator  
Mill Pres: M Hopkins  
(See Vulcan & Callahan Zinc-Lead)  
(See Ariz, Calif, Colo, Ill, Kan, Md,  
Mont, Nev, N J, N Mex, N Y, Tex,  
Utah, Wash & Federal Mng & Smelt-  
ing Co, Mo)

**ANACONDA CO, THE**  
25 Broadway, New York 4, NY  
Corda, Idaho

Pres: Clyde E Wood  
Exec VP: E S McGinnis  
Sec & Treas: C Earle Moran  
VP, Chg West Oper: C H Steele  
Gen Mgr, West Min Oper: A C  
Bigley, Butte, Mont

Gen Sup's of Mines: A R Simms,  
Butte, Mont  
Ch Mech Eng: R J Kennard, Butte,  
Mont

**PHOSPHATE MINE**, Conda, open pit,  
phosphate rock

Mine Sup't: L E Traeger  
Mine Pres: W J Desell  
1000-TON CRUSHING, WASHING  
& DRYING PLANT, Conda  
Mill Pres: Charles Giles  
Assayer: A T Peterson  
(See Calif, Mont, Nev, N Mex, N Y,  
Utah)

**ANDERSON DEVEL CORP**  
Gimlet  
**BULLDOG MINE**, Ag, Cu, Pb  
Idle

**ANDERSON, V**  
Talache Star St, Sandpoint  
**OLD TALACHE MINE**, Pend Oreille  
dist, Bonner County, Au, Ag, Cu,  
Pb, Zn

**AREHART & CROWDER LEASE**  
c/o Harley C Arehart, Star Rd  
Smelterville  
**IDAHO GOLDFIELD**, Coeur d'Alene  
dist, Kootenai County, Au, Ag, Cu,  
Pb, Zn

**AUSTIN - MEYER CORP**  
642 Payton Blvd, Spokane 1, Wash  
**WEBER MINE**, Lakeview dist,  
Bonner County, Au, Ag, Pb

**BAD BEAR MINE**  
Idaho City  
Part: E L Breen & Frank G Clement  
**MINE**, Bear Run Road, undergr., Au,  
Ag  
Prod: 15 tons  
15-TON GRAY MILL, at mine

**BANNER - IDAHO MINES,  
INC**  
Scott Blvd, Wallace  
Pres: John Davis  
VP: C W Bentley  
Sec-Treas: J W Comerith  
Ass't Sec: H F Magnuson  
Idle

**BAUER, MAX & JESS  
HUTCHINSON**  
Gibsonville  
**FOREST HILL LODE**, Lemhi Co.,  
Au, Ag, Cu, Pb, Zn  
Under devel

**BAUMHOFF - MARSHALL CO**  
Big Creek, Cascade Valley  
Pres: Fred Baumhoff  
Dir Master: Jack Fischer  
6-CUBIC-FOOT DREDGE, Big Creek,  
Cascade Valley, monazite  
Mile  
**MAGNETIC SEP PLANT**, Boise,  
monazite, Zr, R, garnet  
Supt: Albert H Whitehead  
Account: Gray Eyman

**BATHORSE MINE, INC**  
Challis  
Pres: O J Salisbury  
VP & Gen Mgr: W B Swigert  
Sec-Treas: O O Langness  
**BEARDSLEY & RAMSHORN MINE**,  
15 Mi SW of Challis, undergr., Ag,  
Pb, Cu  
Idle  
(Leased from Ramshorn Mines Co)  
**PACIFIC & FOREST ROSE GROUPS**,  
15 mi SW of Challis, undergr., Pb,  
Ag, Zn, Cu, Au  
Idle  
100-TON GRAY PLOT MILL,  
Bayhorse  
(Leased from Arima Mng & Invest Co.,  
Utah)

**BEHRENS BROS**  
Elk City  
Mgr: W T Behrens  
**LITTLE MOOSE CREEK PLANT**,  
Elk City dist, Idaho County, Au, Ag  
Idle

**BEHRENS, DONALD E**  
Elk City  
**GOLD POINT MINE**, Idaho County,  
Au, Ag  
Idle

**BEHRENS, HAROLD E &  
LOGSDON, A M**  
Box 113, Spokane, Wash  
**BEHRENS PLACER**, Hoodoo dist,  
Latah County, Au, Ag  
Idle

**BELL CROSS URANIUM, INC**  
c/o Virgil's Cross, Jerome  
**BELL CROSS MINE**, Custer County,  
U<sub>3</sub>O<sub>8</sub>  
Under devel

**BEVERLAND, HARVEY**  
Box 456, Mackay  
Pres: Harvey Beverland  
**CORN HUSKER MINE**, Pb, Ag  
Prod: 100 tons per month

**BIG EIGHT MNG CORP**  
Box 1945, Boise  
Pres, Gen Mgr & Purch Agt:  
A A Creech  
VP & Gen Sup't: Bob Guest  
Sec: Dale Chamberlin  
Treas, Ass't Gen Mgr & Ass't Sec:  
Clyde W Creech  
Geol & Mine Sup't: Dale Creech  
**BIG EIGHT MINE**, Dixie, 35 mi NE  
of Mt Home, open pit, placer, Ag,  
Pb, Au  
Under devel

**MINING WORLD**

**BIG FOUR MINE**

Riggins  
Ops: Scott & Howard Williams  
MINE, Florence & French Creek dist., Idaho County, Au, Ag, Cu  
Idle

**BIG IT MNG & MLC CO**

7542 Jones Ave NW, Seattle 7, Wash  
Pres: Mrs Fay Kinney  
BIG IT MINE, Pine Creek, Smelterville, schoolite  
Idle  
(Under lease to Eberhard & Schmidt+ roth)

**BIG SALMON URANIUM INC**

881 Main St, Lewiston  
Pres: Philip W Jungert  
VP: Clyde E Jungert  
Sec-Treas: James S Aram  
MINE, Riggins, undergr., open pit, placer, Usg, Pb, Th, Au  
Gen Mgr: Philip W Jungert  
Idle

**BITTERROOT URANIUM, INC**

Salmon  
Pres: I J Wilhite  
VP: John Gunnels  
Sec: Arthur V Seay, Jr  
Treas: Carl A Person  
SURPRISE MINE, Gibbonsville, undergr., surface  
Gen Mgr: Merl A Wilhite  
Geol: George E Summers, Jr  
Under devel  
800-TON SCREENING MILL  
Under const

**BLACK BEAR MINES CO**

Wallace  
BLACK BEAR GROUP, near Gem, 3 mi E of Wallace, Pb, Ag, Au  
(Leased to Black Bear Silver-Lead Mines)

Under devel

**BLACK BEAR SILVER + LEAD MINES, INC**

Box 847, Wallace  
Pres: Geo F Ringel  
Sec-Treas: F H Kingsbury  
BLACK BEAR GROUP, near Gem, Shoshone County, Ag, Pb, Zn, Cu  
(Leased from Black Bear Mines Co & being developed by Metropolitan Mines Corp)  
METROPOLITAN GROUP, Shoshone County, Ag, Pb, Cu  
Under devel  
(Leased to the Metropolitan Mines Corp)

**BLACK BULL MINE**

Own: Ralph Baumgardner, Boise

E G Peron, Sanger, Calif

MINE, 30 mi E of Salmon, open pit, Th, Usg

Under devel  
(Under lease to Lewis Food Co, 817 E 18th St, Los Angeles 2, Calif)

**BRADLEY & ECKSTROM, INC**

34 California St, San Francisco II, Calif

MINES, variety of minerals  
(See Aris, Calif, Utah)

**BRADLEY MINING CO**

Bradley Field, Boise

Exec VP: John D Bradley

YELLOW PINE MINE, Stibnite

undergr. & open pit, WD, Zn, Au, Ag

Mgr: Edwin Adams  
Idle

IMA MINE, Patterson, undergr., WO<sub>3</sub>, Ag, Cu, Pb

Mgr: J A Miller

185-TON GRAV-PLOT MILL, Patterson

Idle  
(See Calif, Nev)

**BROUGH, FRED J**

Salmon

POPE-SHENON MINE, Cu

Idle

**BROWN BEAR MINES INC**

Farnum Bldg, Sandpoint

Pres: Russell Oliver

VP: George Hines

Sec-Treas: A R Nelson

MINE, 7 mi from Sagei

Idle

**BUCKSKIN MINES, INC**

4133 W Holden St, Seattle 8, Wash

BUCKSKIN MINE, Clayton, undergr.

Gen Mgr: J M Mensen

Under devel  
(See Wash)

**BUNKER HILL CO, THE**

The Bunker Hill Bldg, 660 Market St, San Francisco 4, Calif  
Pres: John D Bradley  
VP: Emmett G Solomon, W G Woolf, D L Feathers, R H Cutting, H E Lee

Sec: D L Feathers

Treas: Emmett G Solomon

Purch Agt: Gil Mayes

Mine Mgr: Joe Gordon

Ch Geol: R H McConnell

Mgr, Plant Ser: L M Griffith

BUNKER HILL & CRESCENT MINES, Box 29, Kellogg, undergr., Pb, Ag, Zn

Mine Mgr: Joe Gordon

Sup: E B Olds

Ch Min Assayer: Irving Laskey

Mine Frm: Paul Sloan, Don Wilson, George Mast, William Coker

Prod: 1,500 tons

**2500-TON PLOT CONCENTRATOR, KELLOGG**

Mill Supt: Norman J Sather

Asst Mill Supt: J Gordon Craig

Mill Frm: Paul Tietje

LEAD SMELTER, Kellogg

Supt: George Dunn

Asst Supt: Charles Hansen

Ch Research Met: Donald Ingvaldstad

Ch Chem: L W Burgess

Prod: 100,000 tons

**ELECTROLYTIC ZINC PLANT, KELLOGG**

Supt: Wolf Schmittroth

Ch Research Met: Gregory Popoff

Ch Research Chem: Leo Baumeister

Prod: 73,000 tons

**STAR MINE, Burke (Operated by contract by Hecla Mng Co)**

RED BIRD MINE, Clayton, undergr., Pb, Ag

Mill Supt: James Doyle

**CALERA MINING CO****BLACKBIRD DIV**

Cobalt

BLACKBIRD MINE, Cobalt, undergr., cobalt, Cu, Ni, Au, Ag

Prod: 1,000 tons

Mgr: E B Douglas

Geol: W C Cole

Mech Eng: J P Smith

Mine Supt: K Kute

Mine Frm: W O'Neal

Mine Eng: C J Whitley

1,000-TON PLOT MILL, Mill Supt: C O Hower

Mill Frm: John Vecchies

Assayer: Darrel Smith

(Subsidy of Howe Sound Co)

See Utah

**CAMAS URANIUM MNG & DEVEL CO**

Gionding

Op: Donald F Faught & Lowell Fields

20 CLAIMS, Little Smoky district, Camas County, undergr., Au, Ag, Pb, U<sub>3</sub>O<sub>8</sub>

Under devel

**CAMPBELL, WALTER S**

West 820 Nona, Spokane, Wash

LUCKY WIN MINE, S fork of Clearwater River, Idaho County, undergr., U<sub>3</sub>O<sub>8</sub>

Under devel

**CAPITAL SEABOARD CORP**

Western Div, P O Box 1847, Farmington, N Mex

Pres: Jon H Corbin

VP: Chas V Yetter

Sec: W A Pope, Jr

Treas: Howard L Corbin

LONG DIKE COBALT MINE, Cobalt, Lemhi County, undergr., cobalt, Cu

Gen Mgr: C W Yetter

Geol: E H Hamblen

Under devel

(See Aris, Mont, N Mex, Utah)

**CAPITOL SILVER LEAD MNG CO**

Gearon Bldg, Wallace

Pres: H C Mowery

VP: Joe Swan

Sec-Treas: W A Callaway

MINE, Ag, Pb

Under devel

**Castle, George**

Box 47, Ketchum

EDGES MINE, Blain, Ag, Pb, Zn, Cu

Under devel

**CHALLIS VIEW MINE**

Challis

Own: Henry & Elia G Smith

MINE, 8 mi W of Challis, Daugherty Gulch, Ag, Pb

Idle

**CHAMPION MINE**

Box 281, Mackay  
Pres: J L Austin  
MINE, 8 mi S of Mackay, undergr., Pb, Cu, Ag  
Prod: 15 tons crude

**CIRC TWINS MNG CORP**

Orogrande  
Pres: Ross R Brattain, 4011 E Mercer Way, Mercer Island, Wash  
VP: Orville H Brattain

Sec-Treas: Mari Brattain

PETSITE MINE, open pit, Au, Cu, WO<sub>3</sub>

Gen Supt: Sam Alm

Under devel

PENMAN GROUP, undergr., Au

Idle

**CLAIMS**

undergr., Au

Idle

**CLARK, EDWARD B**

Box 151, Clark Fork  
LUCKY OPAL & SURPRISE GROUPS, 3 mi NE of Clark Fork, Pb, Zn

Idle

**GREEN MONARCH LEASE**

Pb, Ag, Zn

Idle

**CLAYTON SILVER MINES**

Box 890, Wallace

Pres: W M Yeaman

VP: John Preissner

Sec-Treas: Ray Morrison

CLAYTON SILVER MINES, Clayo, undergr., Pb, Ag, Zn

Idle

**CLEARWATER DREDGING CO**

218 E Trent, Spokane 2, Wash

Pres: Vernon F Finch

CROOKED RIVER MINE, Elk City, Idaho County, Au, Ag

Idle

**COEUR D'ALENE MNG CO**

203 Taylor Bldg, Wallace

Pres: H C Mowery

VP: P E Jacobs

Sec: W A Callaway

MINERAL POINT MINE, Osburn, 1 mi S of Osburn, Ag, Cu

Under devel

(Operated by Polaroid Mng Co)

**600-TON PLOT MILL****COEUR D'ALENE MNG CO**

c/o Eugene F McCann, Box 638 Wallace

Pres: T M Reynolds

Sec: Carrie M Fuller

PLACER, 18 mi N of Wallace, Au

Gen Mgr: Eugene F McCann

Idle

**COEUR D'ALENE SILVER GIANT, INC**

Box 838, Kellogg

Pres & Gen Mgr: Harry G Alway

VP: R E Newman

Sec-Treas: Wayne A Brainard

MINE, E Fork of Big Creek, Kellogg, Ag, Pb

Idle

**COME BACK MNG CO**

Idaho City

Acting Pres: Joseph E Gornick

VP: Frank E Lunka

Treas-Gen Mgr & Sec: L P Trager

MINE, 20 mi N of Idaho City, undergr., Au, Ag, Pb, Zn, Cu

Under devel

**CONJECTURE MINES, INC**

326 Wiggett Bldg, Coeur d'Alene

Pres & Purch Agt: Donald E Major, 421-227 W Third Ave, Spokane, Wash

VP: H E Sanderson

Sec & Treas: Lyle H Fornell

CONJECTURE MINE, Lakeview Lodge via Bayview, 5 mi SE of Lakeview

Landing, undergr., Ag, Pb, Zn, Cu, Au, Sb

Gen Mgr: Donald E Major

Asst Gen Mgr & Mine Sup: Walter N Campbell

Mech Eng: Ernie Williams

Met: Frank Eichleberger, Jr

Asst Mine Sup: Ronald Uts

Prod: 80 tons

Under devel

**60-TON PLOT MILL**

at mine, Ag

Mill Supt: Frank Eichleberger, Jr

(See Wash)

**DUVALL CO**

210 Eccles Bldg, Ogden, Utah

VIRGINIA GROUP, Blackpine dist., Cassia County, Au, Ag

Idle

**EAST SILVER BELT LEAD MINES, INC.**

Box 685, Wallace

Pres & Mgr: R E Sorenson

Sec: Elie Erdman

MINE, Near Mullin, Pb, Zn, Ag

Idle

**EASTER STAR MNG CO**

Dishman, Wash

Pres: Ivan Thompson

MINE, Shoshone City, Fe

Under devel

**EBERT, WALTER**

Fernwood

PLACER MINE, St Joe Dist, Benewah County, Au

Idle

**CONTINENTAL MNG CO**

Box 468, Wallace

Pres: S K Garrett

Sec-Treas: H F Magnuson

Gen Mgr: C E Small

Idle

**COPPER QUEEN MINE**

Salmon

Op: E G Peron

MINE, Mackina dist, Lemhi County, Au, Ag, Cu

Own: Charlie Kapp & Lester Prant

Under devel

**CORDERO MNG CO**

131 University Ave, Palo Alto, Calif

VP: S H Williamson

Gen Mgr: J Eikon Gilbert

WILD HORSE MINE, Mackay, 35 mi

W of Mackay, undergr., Cu, WO<sub>3</sub>

Asst Gen Mgr: P V Haas

Gen Supt: Edward Hager

Idle

**50-TON GRAV MILL**

at mine

(See Calif, Nev, Ore)

**CUBA MINING CO**

Wallace

Pres: W M Yeaman

MINES, 2 mi from Wallace, Ag, Pb

Idle

**DAISY KING'S CLAIMS**

Garden Valley

Own: E W Bowman

CLAIMS, Deadwood Basin, Ag, Au

Idle

**DAY MINES, INC**

Box 1010, Wallace

Pres & Gen Mgr: Henry L Day

Asst Gen Mgr: Rollin Farmer

Sec: S F Heitfeld

Purch Agt: G T Kelton

DAYROCK, MONITOR, TAMARACK,

HERCULES MINES, Wallace, undergr,

Pb, Ag, Zn

Gen Supt: C E Sparks

Prod: 400 tons

**4 PLOT MILLS**

Mill Supt: L A Grant

1 Mill idle

**DELMAR MNG & MLC CO**

**Idaho**

**EDAH-HOW URANIUM, INC**  
Salmon  
Pres & Gen Mgr: W W Lowe  
Sec: Ed Sargent  
**EDAH-HOW URANIUM MINE**, Salmon,  
U.S.  
Under devel

**ELDO PLACER MNG ASSN**  
Pierce  
Mgr: A J Rooben  
**ELDO PLACER CLAIMS**, Idaho County,  
Au, Zn, Monazite, Bismuth, Rutile  
Under devel

**ELDRIDGE, S S**  
Birch Creek  
**WORTHING MINE**, Lemhi County,  
Ag, Pb, Zn, Cu  
Mile

**ELMQUIST, DON**  
Pearl  
MDE, Au, Ag, Cu, Pb  
Idle

**EMPIRE SUN VALLEY MNG CORP**

300 Main St, Park City, Utah  
Pres: Tom P Coates  
Sec: William H Bahns  
Mgr: Emmett Yadon  
**CLAIMS**, Hailey, Bullion Gulch dist,  
Pb, Au, Zn, Ag, U<sub>3</sub>O<sub>8</sub>  
100-TON MILL, Hailey

**ENDERLIA, ELMER**  
Hailey  
MINE, Ag, Cu, Pb  
Idle

**EPP, GEORGE H**  
1441 San Jose, Compton, Calif  
**BEAR TRACK #1 & 2**, Warren dist,  
Idaho County, Au, Ag, Cu, Pb, Zn  
Under devel

**ESKRIDGE, CLAY**  
Gannett, Idaho  
**COFFEE POT**, Galena dist, Blaine  
County, Au, Ag, Cu, Pb, Zn  
Under devel

**ESTES GOLD MINES, INC**

Box 478, Mackay  
Pres: C E Lansing  
VP: D E Bell  
Sec: Peter Scherer  
**YANKEE PORTK MINE**, Sunbeam,  
undergr, Au, Ag, Cu  
Gen Mgr: David E Bell  
Prod: 50 tons  
60-TON FLOT MILL, at mine  
**ALUTRA MINE**, Sunbeam, undergr,  
Au, Ag  
Idle

**EUREKA SILVER-KING MINES CORP**  
516 First Nat'l Bank Bldg, Boise  
**SILVER-KING**, Valley County, Ag, Au  
Cu, Pb, Zn  
Idle

**FAIRFIELD MNG CO, INC**  
831 E Main St, Stockton, Calif  
Pres & Purch Agt: LeRoy & Washburn  
VP: Ray Jones  
Sec & Treas: F M Laccoccini  
**ALVA, EL CAMINO & GOAT MT LODES, Quartz**  
**PRINCETON & ALAMEDA PLACER CLAIMS**, 2 Fork Boise Riv  
Gen Mgr & Mine Prm: LeRoy  
Washburn  
Asst Gen Mgr & Mine Supt:  
Clifton Finley  
Met & Mine Eng: Ray Steyer  
Under devel

**FALL CREEK URANIUM CORP, INC**

269 10th St, Idaho Falls  
Pres & Gen Mgr: Donald Jerman  
Sec: Ralph O Waddoupe  
**CLAIMS**, Bonneville County near  
Swan Valley, U<sub>3</sub>O<sub>8</sub>  
Under devel

**FEDERAL URANIUM CORP**  
P O Box 1317, Salt Lake City,  
Utah  
**CONJECTURE**, Bonner County,  
Au, Ag, Cu, Pb, Zn

**FLORENCE BASIN PLACERS**  
851 Main, Lewiston  
Pres: Philip Jungert  
VP: Clyde Jungert  
Sec: James S Aram  
Treas: Marion Jungert  
**FLORENCE PLACERS**, Florence,  
placer, Au, Th, Monazite, Zircon,  
Titanium  
Under devel

**FLORIDA MT JOINT VENTURE**  
Box 1000, Boise  
**ONTARIO MINE**, Carcass dist,  
Owyhee County, Au, Ag  
Idle

**FRIESTAD, ARNE**  
Hailey  
**WESTLAKE GROUP**, Blaine County,  
Ag, Pb, Zn  
Idle

**GEM MINES, INC**  
Warren  
**THE RESCUE MINE**, Idaho County,  
Au, Ag  
Idle

**GEM STATE CONSOLIDATED MINES, INC**  
3620 Sycamore Drive, Boise  
**DEWEY GROUP**, West View dist,  
Gem County, Au, Ag, Cu, Pb, Zn  
Under devel

**GLAHN, EUGENE**  
Box 106, Bellevue  
**SCORPION MINE**, Little Wood River  
dist, Blaine County, Au, Ag, Cu,  
Pb, Zn  
Under devel

**GOLCONDA LEAD MINES**  
Box 469, Wallace  
Pres & Gen Mgr: J A Featherstone  
VP & Treas: H F Magnuson  
Sec: D H Camp  
**GOLCONDA MINE**, 2 1/2 mi E of  
Wallace, undergr, Pb, Ag, Zn  
200-TON FLOT MILL, Julian Rd,  
Wallace

Mill Supt: C E Bloom  
Asst Mill Supt: Richard Holmberg  
Assayer: Peter Mack  
Idle

**GOLDEN NUGGETT MINES & MLO, INC**  
Fairfield  
Pres & Gen Mgr: Harry T Furrow  
VP: Wm Fiscus  
Sec-Treas: Midred Robinson  
**GOLDEN NUGGETT MINE**, Little  
Smoky & Carrieton dist, Cassia  
County, undergr, surface  
Under devel

**GOLDEN RIDGE URANIUM CO, INC**

Box 271, Idaho Falls  
Pres: Karl M Pratt  
Sec: A Merrill  
Mgr: Joe H Dennis  
**GOLDEN RIDGE CLAIMS #1 to 13**,  
Terreton & Robbie, open pit, U<sub>3</sub>O<sub>8</sub>  
Under devel  
150-TON FLOT MILL

**GOLDSTONE MNG CO**  
81 Securities Bldg, Seattle, Wash  
Pres & Gen Mgr: B W Porter  
VP: Emil Mottman  
Sec: F L Miller  
**GOLDSTONE MINE**, Salmon, 21 mi  
SE of Salmon, undergr, Au, Cu, Pb  
Gen Mgr: Walter Delighton  
Geol: Arthur Lakes  
Under devel  
150-TON FLOT MILL

**GRANADA LEAD MINES, INC**  
Box 257, Wallace  
Pres: E G Grasdrager  
VP: R L Roundy  
**GRANADA MINE**, 2 1/2 mi E of  
Wallace, Pb, Ag  
Under devel

**HAI'PER, DON**  
Clark Fork

**LAWRENCE MINE**, Ag, Cu, Pb, Zn

**HAILEY TRUST CO**  
Hailey  
**MINE**, Camp Creek, U<sub>3</sub>O<sub>8</sub>  
Under devel

**HANSY COPPER & GOLD MINES**

Box 588, Wallace  
Pres: Osa Belsky  
VP: Osborne Belsky  
Gen Mgr & Purch Agt: Sam Peterson  
Sec: Rudy Brown  
**HANSY MINE**, 3 mi SE of Adair,  
undergr, Cu, Au, Ag  
Under devel

**HAROLSON, H L**

Shop  
**GOLDEN EAGLE PLACER MINE**,  
Mineral Hill dist, Lemhi Co, Au, Ag

**HAYDEN HILL CONS MNG CO**  
Box 178, 909 W Sprague Ave,  
Spokane, Wash  
Pres: W G Stratton

**VP: J B Phillips**  
Sec: C C Anderson  
Gen Mgr: R R Weideman  
**PURIM GROUP**, Silver Belt, Coeur  
d'Alene  
(Leased to Silver Dollar Mng)

**HEATH, TED D**

Box 111, Fairfield  
**AUDRY GROUP & BETTY**, Soldier  
dist, Camas County, Ag, Au

Under devel  
**MOUNTAIN VIEW GROUP**, Skeleton  
Creek dist, Elmore County, Ag, Au  
Under devel

**HELAAS MNG CO**

Box 320, Wallace  
Pres: L Randall  
VP: J L McCarthy & R E Sorenson  
Sec-Treas: John R Matthews  
Purch Agt: R O Hull  
**STAR MINE**, Burke, undergr, Zn,  
Pb, Ag  
Mgr: Miner: William H Love  
Ch Geol: H E Harper  
Mech Eng: Harry Graff  
Elec Eng: N Huhta  
Mine Prm: William Dunphy  
Ch Eng: Wallace Crandall  
Prod: 800 tons  
(Owned by The Bunker Hill Co)

**800-TON FLOT MILL**, Burke, Zn, Pb  
Mill Supt: James Hunter  
Mill Prm: Robert Miller  
Assayer: Thomas Hydora  
(See Utah)

**HEISEN, C H**

Mackay  
**McFADDEN MINE**, Custer County,  
Ag, Pb  
Idle

**HERMADA MNG CO**

Twin Springs  
Pres & Mgr: Ernest Oberbillig  
VP: Jess Hawley, Jr  
Sec-Treas: Carol Oberbillig  
**HERMADA MINE**, 20 mi W of  
Atlanta, surface  
**TALACHE CUSTOM FLOT MILL**,  
Atlanta  
Idle

**HESS, GORDON**

Box 395, Murray  
**KLEPPINGER FRACTION PLACER**,  
Eagle Dist, Shoshone County, Au, Ag  
Idle

**HIGHLAND - SURPRISE CONS MNG CO**

Box 889, Gyde-Taylor Bldg,  
Wallace  
Pres: Frank J Luedke  
VP: Henry C Smith  
Sec-Treas: W A Callaway  
**HIGHLAND-SURPRISE MINE**,  
Kellogg, 15 mi SW of Kellogg,  
undergr, Zn, Pb, Ag  
Idle

**300-TON FLOT MILL**

Idle

**HILLTOP MINE**

122 1/2 1st St, Pocatello  
Mgr: J E Hamilton  
**MINE**, Lemhi County, Au, Ag, Pb, Cu  
Idle

**HINES, MARVIN**

Sagle  
**BROWN BEAR MINE**, Pend d'Oreille  
dist, Bonner County, Ag  
Under devel

**HOLLY MINERALS CORP**

340th St NW Albuquerque, N Mex  
Pres: A H McRae  
VP: J G Heaston  
**HERMES MINE**, Yellow Pine, undergr  
St. Hg  
Gen Mgr: James C Brasfield  
Mine Supt: Art Emerson  
Mine Prm: Joe Phelps  
Prod: 300 tons per yr

**200-TON FLOT MILL**, at mine  
Mill Supt: Bob Payne  
Mill Prm: Everett Mock  
(See N Mex, N Y)

**HOPE SILVER LEAD MNG, INC**

Box 152, Clark Fork  
Pres: Glenn C Lee  
VP: Ed Groening  
Sec-Treas: L P Larson  
**HOPE MINE**, undergr, Pb, Ag, Zn  
Frms: E T Shields  
Eng: Harold Shields  
150-TON FLOT MILL  
Idle

**HORN SILVER MNG & MLG CO**

Box 1010, Wallace  
Pres: Henry L Day  
Sec-Treas: R W Anno  
**MINES**, 3 mi S of Wallace, Ag, Pb, Cu  
Idle

**JUMPS OF GOLD MINE**

Wallace  
Own: Lee Earhart & Richard May  
MINE, 15 mi E of Orogrande,  
undergr, Au, Ag  
Idle

**HUNGRY HILL MINE**

Salmon  
**MINE**, Eldorado dist, Lemhi County,  
Au, Ag, Cu

**HUNTLEY, JAMES**

c/o Grand Hotel, Boise  
**HAY FORK**, Boise Basin dist,  
Boise County, Au, Ag, Cu, Pb, Zn  
Idle

**HYPOTHEEK MNG & MLG CO**

510 Bank St, Wallace  
VP: Sig Torkelson  
Sec & Gen Mgr: Roy H Kingsbury  
OIL HYPOTHEEK & KING OF FIVE  
CREEK MINES, Kingston, Au, Ag, Pb  
Idle

(See Mont, Utah, Wash & King of  
Pine Creek Min Co, Idaho)

**IDAHO - ALTA METALS CORP**

Mackay  
**EMPIRE MINE**, Alder Cr dist,  
Custer County, Au, Ag, Cu, Pb, Zn  
(See N Y)

**IDAHO CONSOL MINES, INC**

4109 Arcade Bldg, Seattle, Wash  
Pres & Purch Agt: Edmund O Wilson  
VP & Treas: Fred J Wetrick  
Sec: H D Merrick  
**TWIN PEAKS MINE**, Salmon, 18 mi S  
of Salmon on US Hwy 93, undergr,  
Pb, Cu, Ag, Au  
Gen Mgr: Edmund G Wilson  
Gen Supt: H D Merrick  
Geol & Mine Eng: Allen C Merrick  
Mine Supt & Prm: H D Merrick  
Prod: 125 tons

**150-TON FLOT MILL**, at mine  
Mill Supt: H D Merrick

**SMELTER**, Salt Lake City, Utah

Under devel

**IDAHO - CONTINENTAL MINE**

Bonners Ferry  
**MINE**, Fort Hill dist, Boundary  
County, Ag, Cu, Pb, Zn  
Idle

**IDAHO CUSTER SILVER-LEAD MINES, INC**

Box 459, Wallace  
Free: Alvo V Alvensleben  
VP: O O Miller  
Sec & Treas: H F Magnuson  
**LIVINGSTON MINE**, 16 Mi S of  
Clayton, Pb  
200-TON MILL

**IDAHO GARNET ABRASIVE CO**

Fernwood  
Own & Op: Lowell Thompson  
Asst Mgr: Everett Thompson  
Sec: Hershel Tripp  
**EMERALD CREEK DIGGINOS**, 8 mi  
S of Fernwood, placer, garnet  
Prod: 8,000 tons per yr  
100-TON JIG & CRUSHING PLANT,  
Emerald Cr

**IDAHO GOLDFIELDS, INC**

737 Peyton Bldg, Spokane, Wash  
**IDAHO GOLDFIELDS**, Cour d'Alene  
dist, Kootenai County, Au, Ag, Cu,  
Pb, Zn

**IDAHO LAKEVIEW MINES CO**

508 Columbia Bldg, Spokane, Wash  
Pres & Gen Mgr: J L Drumheller  
VP: Kenneth M Howser  
Sec-Treas: L R Gordon  
Purch Agt & Gen Supt: Earl A McDaniel

**LAKEVIEW MINE**, Lakeview, undergr,  
Ag, Pb, Zn  
Idle

**KEEP COOL MINE**, Lakeview, undergr,

Pb, Ag, Zn, Au, Cu

Idle

**80-TON FLOT MILL**

Mill Supt: L A Denner

**SMELTER**, Kellogg

**IDAHO MINING COMPANY**

Box 890, Kellogg  
Pres: C Aubrey Grissom  
VP: L E Beeson  
Sec & Gen Mgr: Bruce E Allgater  
WASHINGTON-IDAH MINE, W fork,  
Moon Creek, 6 mi NE of Kellogg,  
undergr, Pb, Zn, Ag, Cu  
Idle

**IDAHO THORIUM CO., INC**

Mackay  
Pres: J H Stocks  
VP: A L Stocks  
Sec: Kenneth Deming  
MINE, Salmon, undergr & surface  
Th, U<sub>3</sub>O<sub>8</sub>, rare earths  
Under devel  
MINE, Tinday, surface  
Under devel

**IDAMONT LEAD-ZINC MINES CO**

S 232 Lincoln St, Spokane, Wash  
Pres R H Russell  
VP: B A Smith  
Sec W B Russell  
IDAMONT MINE, Leonia, undergr,  
surface & placer  
Idle

**INDEPENDENCE MINE**

c/o J B Eldridge, Placerville  
MINE, Big Cr dist, Valley County,  
undergr, Ag, Au, WO<sub>3</sub>, CaF<sub>2</sub>, Sb  
Gen Mgr: J B Eldridge  
Idle

**INDEX - DALEY MINES, INC**

21 SW Temple, Salt Lake City,  
Utah  
INDEX-DALEY MINE, Dixie, Elmore  
County, Au, Ag, Cu, Pb, Zn  
Idle

**INSPIRATION LEAD CO**

W 909 Sprague Ave, Spokane 4  
Wash  
Pres E H Carlson  
VP C C Anderson  
Sec-Treas & Gen Mgr: W T  
Anderson  
Purch Agt & Gen Mgr  
R R Weideman  
INSPIRATION LEAD MINE, 304 2 St  
Wallace, undergr,  
Gen Sup: R H Weideman  
Geol: W H Simons  
Mine Supl: Horace Smith  
Under devel  
(See Utah)

**IRON MASK MINING CO**

Rox Hill, Sandpoint  
Pres & Purch Agt: George M Watt  
VP R J Evans  
Sec-Treas: Robert W Woods  
THE IRON MASK MINE, Talache  
dist, Bonner County, undergr, Ag,  
Au, Cu  
Gen Mgr: G M Watt  
Geol: Donald Kotschevar  
Under devel

**IRON MT MNG CO, INC**

Box 848, Weiser  
Pres: Eugene C Metrick  
VP: John Lloyd  
Sec & Treas: Claudia J Merritt  
MORTIMER GROUP, 30 mi N of  
Weiser, undergr, Pb, Ag, Cu, Zn,  
Au  
Under devel

**ISABELL CONST CO**

Box 2351, Reno, Nevada  
BLACKBIRD MINE, Cobalt, contract  
mining for Calera Mng Co

Sup: Ted Maestretti

(See Arco, Nev, Utah, Wash)

**JACKSON, TOM**

Hailey  
BARITE LODE, Blaine County, Ag,  
Cu, Pb  
Idle

**JIREH MNG CO**

Box 449, Bonners Ferry  
IDAHO CONTINENTAL MINE, Ag,  
Cu, Pb, Zn  
Idle

**JOHNSON, CLAIR**

Orangetown  
JOHNSON MINE, Ten mile dist,  
Idaho City, placer, Au, Ag  
BIG CREEK MINE, Idaho County,  
Au, Ag  
Idle

**JOHNSON, F A**

Pt 1, Eagle  
BLUE RIDGE MINE, Grimes Pass  
dist, Boise County, Au, Ag, Cu, Pb  
Under devel

**JOHNSON, NELS D**

8821 NW Springville, Portland 9,  
Oregon

LUCKY DAY, Yankee Fork dist,  
Custer County, Au, Ag, Cu, Pb, Zn  
Under devel

**JONES, E L & ASSOCIATES**

P O Box 289, Worcester  
MORTIMER CLAIMS, Washington  
County, Fe

**JOSUE, A W**

Garden Valley  
SUNNYSIDE MINE, S Fork Payette  
Riv, Boise County, placer, Au, Ag  
Idle

**KALLAS, SR, JOSEPH F**

Box 1719, Boise

MINE, Ada County, Au, Ag

Idle

**KANE, CHARLES B**

Mackay  
BLUE JAY MINE, Cu

Idle

**KENISON, BEN V & JESSIE**

Johnson  
Grandview

GEM STATE SILVER, Idaho River  
dist, Owyhee County, Au, Ag, Cu,

Pb, Zn

Under devel

**KIMBALL, ELROY**

Mackay  
TURTLE MINE, Custer County, Ag,

Pb

Idle

**KING OF PINE CREEK MNG CO**

612 Chronicle Bldg, Spokane, Wash

Pres: C C Anderson

Mgr: W T Anderson

VP: E H Carlson

Sec: L Howe

MINE, Wallace

Idle

(Leased to Hypothek Mng & Mlg Co)

**KITTOCK, JACK**

2010 New Perce St, Nease &

MINE Valley County, Au, Ag

Idle

**KUBESH, JAMES E**

1622 9th Ave, Sweet Home, Oregon

DUTCH MILL, FREE GOLD MINES, Inc

Pierce dist, Clearwater County, Au,

rare earths, undergr, placer

Gen Mgr: Kenneth White

Under devel

**25-TON GRAV MILL**

Pierce dist, RETORT FURNACE

(See Oregon)

**LAWRENCE CONS MNG CO**

Clark Fork

Pres: C I White

Sec: C I White, Jr

LAWRENCE GROUP, Clark Fork,

Pb, Ag, Zn, Zn

50-TON CONC

Under devel

**LEAD BLOSSOM MNG & MLG CO**

422 High St, Wallace

Pres: Jerry Gysler

VP: Margaret Denney

LEAD BLOSSOM MINE, Wardner,

undergr, Ag, Pb

Idle

**LEESBURG URANIUM, INC**

230 N 2nd Ave, Pocatello

Pres & Purch Agt: J E Tarr, Jr

VP: B N Worrell, Salmon

Sec: Lee Munk

Treas & Purch Agt: Don Hansen

MINE, undergr, open pit, placer,

U<sub>3</sub>O<sub>8</sub>, Pb, Cu, Au, Ag, monazite

Gen Mgr: J E Tarr, Jr

Asst Gen Mgr: Don Hansen

Under devel

MILL, via Salmon, Idaho, Lemhi

County

**LEONARD, MRS R H**

Silver City via Murphy

DAVIDSON GROUP, 2 mi E of

Silver City, undergr, Au, Ag

Idle

**EMPIRE GROUP, 2 1/2 mi E of**

Silver City, undergr, Au, Ag

Idle

**150-TON PLOT MILL**

Pine Cr

Idle

(See Utah)

**LEONARD BROTHERS**

Silver City via Murphy

Mgr: F L Leonard

Part: Richard M Leonard

PAUPER GROUP, 2 mi SE of

Silver County, undergr, Au, Ag, Cu

2-TON GRAV-AMAL MILL, at mine

Idle

**LEONE MARIE MINE**

David

Ops: Gambling & Skinner

MINE: Bear Lake dist, Bear Lake

County, Ag, Pb

Idle

**LITTLE KLONDIKE MNG CO**

3361 S 2nd E, Salt Lake City, Utah

Pres & Gen Mgr: W A Lyman

Sec: Leda Lyman

LITTLE KLONDIKE GROUP, Idaho

City, Elkhorn dist, Au

Agent: T E McDonald

Explor

**LITTLE QUEEN MINES, INC**

Box 105, Atlanta

Pres: H D Hollenbeck

Sec-Mgr: H M Greenwald

LITTLE QUEEN MINE, Middle Boise

dist, Elmore County, Au, Ag, Pb, Zn,

WO<sub>3</sub>

Idle

**LOOKOUT MT MNG & MLG CO**

Box 838, Kellogg

Pres: Wendell R Brainard

VP: Harry G Alway

Sec-Treas: P J Holtz

Under devel

LOUDERBOUGH, DON

Robert

VALLEY VIEW MINE, Clark County,

Ag, Cu

Idle

**LUCKY FRIDAY SILVER-LEAD MINES CO**

Box 113, Wallace

Pres: Chan E Horning

VP & Gen Mgr: John A Featherstone

Sec-Treas: W J Emacio

LUCKY FRIDAY MINE, Mulan,

Hunter dist, Pb, Ag, Cu, Zn

Prod: 150 tons

Min Supt: David Elder

**LUCKY GEM MNG & MLG CO INC**

Box 245, Emmett

Pres: Nan E Adkins

VP: Nan E Adkins

LUCKY GEM MINE, open pit, U<sub>3</sub>O<sub>8</sub>,

Ag, Pb

Under devel

**LUCKY SIX MNG CO**

Julietta

Pres: Donald Cantrell

Sec-Treas: John Longteig

Gen Supt: Alec McIntosh

Ch Engr: Harold Freeman

455 MINE, 2 mi SW of Clarke

undergr & placer, Ti, Fe, Au

Idle

**41 MINE, Southwick**

6 mi E of Southwick, undergr & placer, Ti,

Fe, Au

Idle

**MACKAY EXPLOR CO**

4212 Franklin Rd, Boise

Pres: W P Barton

VP D E Bell

Sec-Treas: M S Burton

EMPIRE MINE, 3 mi W of Mackay,

Cu, Au, Ag, WO<sub>3</sub>

(Leased to Idaho Lita Minerals Corp,

NY)

MARR, FRANK N

611 Payton Bldg, Spokane, Wash

BUNKER HILL (base), Kellogg,

undergr, Pb, Ag, Zn

Gen Mgr: C F Redding

Mine Frm: Milton Turley

Prod: 50 tons

ISO-TON PLOT MILL

MILL, via Salmon, Lemhi

County

**MASCOT MINES, INC**

Box 98, Kellogg

Pres: Malcolm C Brown

VP & Purch Agt: Dunham Bell

Sec-Treas: H F Magnuson

LITTLE PITTSBURGH MINE,

Pine Creek, Kellogg, undergr,

Au, Pb, Ag

Idle

**150-TON PLOT MILL**

Pine Cr

Idle

(See Utah)

**MAYFLOWER GOLD MINES, INC**

Pocatello

Pres & Gen Mgr: J B Eldridge

VP: H H Eberle

Sec & Treas: G R Eldridge

MAYFLOWER MINE, 3 mi NW of

Pocatello, undergr & placer, Au,

Ag, Zn, monazite, rare earths

Idle

**McCLURE BROS**

Box 334, Hailey

McCLURE BROS

c/o H R McClure, Box 334

Hailey

TREASURE VAULT, Mineral Hill

dist, Blaine County, Au, Ag, Cu,

Pb, Zn

**MC COY MINE CO**

Box 370, Rt 5, Boise

MINE, Box 452, Hailey, 4 mi W & 2

mi S of Hailey, undergr, Au, Ag, Fe

Gen Mgr: Charles H Shepherd

Asst Gen Mgr: W A Shepherd

Under devel

**MILL, at mine****McGOWAN, A W**

Box 137, Challis

POCKET PLACER MINE, Yankee

Fork dist, Custer County, Au, Ag

Idle

**MCRAE TUNGSTEN CORP**

Subsites

Pres: R J McRae

VP: Hubert Martin

Gen Supt: Harry M Sargent

SNOWBIRD & RED BILL PP MINES,

Subsites, 10 mi W of Big Creek,

Valley County, undergr, Scheelite,

Gen Supt: James Collard

Prod: 33 tons

Idle

**96-TON PLOT-GRAV MILL**

Big Cr

**METALINE & PINE CREEK CONSOL MNG CO**

Scot Bldg, Wallace

Pres: Stanley Easton

VP: J M Haffner

Sec: L J Randall

Asst Sec: H F Magnuson

**METROPOLITAN MINES CORP, LTD**

510 Bank St, Wallace

Pres & Mgr: Roy H Kingsbury

Sec-Treas: A J Teske

(See Black Bear Silver-Lead Mines, Inc)

**MILBERT, FRANK & M L DAWSON**

Box 141, Potlatch

HOTELING CREEK IRON DEPOSIT,

Latah County, Fe

Under devel

**MINERAL RECOVERY & ENGINEERING CO**

Box 476, Wallace

Proprietor: Paul H Floyd

WO<sub>3</sub> UPGRADING PLANT (GRAV

FLÖT), Burke Canyon near Gem

Capacity: 20 units WO<sub>3</sub> daily

**Idaho**

<b>MOTLEY &amp; McCONAUGHEY</b> 112 N 4th St, Sandpoint <b>KATHERINE</b> , Pend Oreille dist., Bonner County, Au, Ag, Cu, Pb, Zn Under devel	<b>CLAIMS</b> , Orogrande 4 mi SE of Orogrande on Dixie Road, undergr., Au Idle (Leased to Circ Twins Mng Corp, Wash)	<b>Sec: Leo Eager</b> <b>RAMS HORN &amp; BEARDSLEY MNG,</b> Bayhorse, 70 mi NW of Mackay, Ag, Pb, Cu Idle (Leased to Bayhorse Mines, Inc)	<b>Sec-Treas: Kenneth H Deming</b> <b>MINE</b> , Salmon, undergr., surface, Th, U <sub>3</sub> O <sub>8</sub> , rare metals Under devel
<b>MULLAN SILVER - LEAD CO</b> Scott Bldg, Wallace Pres: J E McKay VP: James Doyle, Jr Sec-Treas: H F Magness	<b>PLAINVIEW MNG CO</b> 603 2nd St, Kellogg Pres & Gen Mgr: S K Garrett Sec: Charles W Simons MINE, Osburn Idle	<b>BARE METALS CORP OF</b> <b>AMERICA, NORTHWEST DIV</b> 1st Security Bldg, Salt Lake City II Utah VP: M H Kline <b>IDAHO-ALMADEN MINE</b> , Box 629, Weiser, Washington County, open pit, Hg Mine Sup: J J Snider Offc Mgr: Jerry Suggen Prod: 175 tons <b>175-TON ROTARY KILN MILL</b> , Weiser Mill Sup: J J Snider (See Ariz, Calif, Utah)	<b>SAN FRANCISCO CHEMICAL</b> CO Montpelier Pres: D L King VP: Max L Spearman & Jerome Taylor Furch Agt: Calvin J Sims <b>WATERLOO MINE</b> , E of Montpelier, open pit, phosphate Gen Sup: Charles C Stephens Mine Sup: Lorraine F Jacobsen (See Utah, Wyo)
<b>NABOB SILVER - LEAD CO</b> Box 329, Kellogg Pres: H J Hull VP, Gen Mgr & Purch Agt: C C Dunkle Sec-Treas: June H Olsen MINE, Pine Cr, undergr., Zn, Pb <b>250-TON FLOT MILL</b> Mill Sup: E M George Idle	<b>POLARIS MNG CO</b> Box 329 Wallace Pres: L J Randall VP: George Zeller Sec-Treas: J R Matthews Purch Agt: R G Hull <b>SILVER SUMMIT MINE</b> , 7 mi W of Wallace, undergr., Ag, Cu Mgr of Mines: William H Love Mine Sup: George Grismer Mine Prm: A P MacDonald Ch Geol: H E Harper Prod: 150 tons <b>300-TON FLOT MILL</b> , Polaris Mill Sup: J H Hunter Mill Frm: Wm Bohn (See American Silver Mng Co, Coeur d'Alene Mng Corp, Rainbow Mng & Mfg Co, Ltd)	<b>WEISER</b> <b>175-TON ROTARY KILN MILL</b> , Weiser Mill Sup: J J Snider (See Ariz, Calif, Utah)	<b>SAWLOG MNG</b> Sheep Gen Mgr: Magnus Bevan Sec: Hazel Bevan <b>TWILIGHT MINE</b> , undergr & surface Under devel <b>3-TON GRAV MILL</b> , at mine
<b>NATIONAL MINES, INC</b> Box 277, Malad Pres: W L Baker VP & Gen Mgr: C A Dye Sec: Blythe G Clemens <b>SENTINEL MINE</b> , 20 mi NE of Rose, Zn, Pb, Ag Idle	<b>RED BIRD MINE</b> Clayton Partners: Buchman, Breckin & Norden Gen Mgr: J A Norden MINE, 8 mi NW of Clayton, undergr., Pb, Ag Under devel	<b>SHAWLEY, C F &amp; ANDERSON,</b> V.E. Elk City <b>GOLDEN EAGLE MINE</b> , Dixie dist., Idaho County, undergr., Au, Ag Idle	<b>SHERWOOD, RAY</b> Burley MINE, Valley County, placers, Au, Ag Idle
<b>NATIONAL URANIUM CORP</b> 510 Bank St, Wallace Pres & Gen Mgr: John T Kingsbury Sec & Agent: Roy H Kingsbury <b>CLAIMS</b> , Boise County, U <sub>3</sub> O <sub>8</sub> Under devel	<b>PORTER BROS CORP</b> Box 647, 2308 Warm Springs Ave, Boise Pres: P Porter VP & Sec-Treas: D L Skidmore Purch Agt: D L Runk <b>BEAR VALLEY PLACER</b> , at Bear Valley, Valley County, placer, columbium, tantalum, uranium, monazite, rare earths <b>300-TON GRAV MILL</b> , Lowman Mill Sup: A L Rose	<b>RELYEA, GEORGE A</b> Pierce <b>RED CLOUD MINES</b> 1-16, 8 mi E of Pierce on Orofino Creek, undergr., Au, Ag Mine Sup: George A Relya Mine Frm: John Pauser Idle (See Mont)	<b>SHUCK, J J</b> Elk City <b>SHUCK'S PLACER</b> , Elk City dist., Idaho County, Au Idle
<b>NEW HILARITY MNG CO</b> Box 27, Spokane, Wash Pres & Treas: Robert B Austin VP: W Brainerd Sec-Treas: E K Barnes Ass't Sec-Treas: E M Borjeson MINE, Box 943, Wallace Frms: Eugene C Iverson Idle	<b>PRAUFS, FRANK</b> Box 6, Leodore <b>BROWN BEAR MINE</b> , Lemhi County, A, Cu, Pb, Zn Idle	<b>RICHARDSON PLACERS</b> Box 746 Salmon Gen Mgr: E G Sheep Ass't Gen Mgr: R M Sheep PLACERS, 22 mi W of Salmon, Au, Ag Under devel	<b>SIDNEY MNG CO</b> 102 Sidney Bldg, Kellogg Pres: M C Brown Sec-Treas: F E Marler Gen Sup: C A McKinley Mech Eng: Zane Smith Purch Agt: A G Philipp <b>SIDNEY MINE</b> , 15 mi S of Kellogg, undergr., Zn, Ag, Pb Prod: 105 tons <b>300-TON FLOT MILL</b> , Pine Cr dist. Sup: C A McKinley
<b>NORTH FORK MNG CO</b> Box 49, Wallace VP: Vernon J Robinson Sec: Earl Chilcott MINE, 10 mi N of Wallace Idle	<b>PREMIER STAR MNG CO</b> Box 132, Osburn Pres: J A Moore <b>LUCRETIA CLAIMS</b> , Hunter dist., Shoshone County Idle	<b>RIPPEN, JOHN</b> Box 131, Atlanta <b>HAZEL QUEEN MINE</b> , Logan County, Au, Ag Idle	<b>SIERRA SILVER - LEAD</b> <b>MINES CO</b> 714 W Shannon, Spokane, Wash <b>HARDSCRABBLE GROUP</b> , Owyhee County, Ag, Pb, Cu Under devel
<b>NORTHWEST MINERALS INC</b> 730 Payton Bldg, Spokane I, Wash Pres: Forrest M Garrett VP: H E Boley Sec-Treas: Don A Gillis <b>HUNTER-CONTINENTAL MINE</b> , Pinhooker, undergr., Pb, Ag Gen Mgr: H E Boley Geol: W Gratian Lynch Idle (assessment work only) (See Wash)	<b>PRINCETON MNG CO</b> Scott Bldg, Wallace Pres: H J Hull VP: J V Grismer Sec-Treas: E F Magness MINE, E of Muilan Under devel	<b>ROBERTSON &amp; STEEPLES</b> Mackay <b>GRANDVIEW MINE</b> , Au, Ag, Cu : Idle	<b>SISTER, SHOSHONE, &amp; TRAPPER</b> GROUPS, Owyhee, Shoshone County, Ag, Pb, Zn Idle
<b>NORTHWEST URANIUM MINES,</b> <b>INC</b> Box 1080, Wallace Pres: F E Scott VP & Gen Mgr: Clark L Wilson Sec: Alton Hall Treas: Jack D Gay Idle (See Wash)	<b>PROFILE TAMARACK MINES</b> Co c/o E P Slovarp, 300 SW 4th Ave, Portland, Oregon Pres: Charles E Thompson Purch Agt-VP: Henry T Abetstein Sec-Treas: Emil P Sincar <b>CENTRAL GALENA GROUP</b> , Yellow Pine, 70 mi NE of Cascade, undergr., Ag, Pb, Zn, Au Under devel (See Oregr)	<b>RUSTLER MNG CO</b> 135 E 3rd St, Casper, Wyo <b>RUSTLER MINE</b> , 10 mi SW of Haley, undergr., Ga, Ag, Zn, U <sub>3</sub> O <sub>8</sub> Gen Mgr: Wm T Deacon III Geol: J H Bright Idle (See Wyo)	<b>SIGNAL MNG CO</b> 410 Main St, Kellogg Pres: H G Alway VP: John B Penney Sec: Wendell R Brainerd Gen Sup: Eugene C Iverson HILARITY GROUP, 7 mi W of Kellogg, undergr., Zn, Pb, Ag Mine Sup: Eugene C Iverson Idle
<b>OXFORD COPPER MNG CO,</b> LTD 221 First St, Orofino Pres: A B Curtis VP, Purch Agt & Gen Mgr: Robert Odell Sec & Treas: Carroll Brock MINE, undergr., Cu Idle MILL, near Pierce	<b>PUMICE, INC</b> Box 517, Idaho Falls Pres: Warren Briggs VP: C G Wylie Sec-Treas: R W Hoops Plant & Min Sup: C E Weaver MINE, 9 mi E of Ammon, surface, pumice Geol: V E Carmontzi Prod: 400 MILL, Ammon	<b>ST PAUL LEAD CO</b> c/o James G Fowles, Sidney Bldg, Kellogg <b>SNOWSHOE &amp; ST PAUL MINES</b> , Ag, Pb, Zn Idle	<b>SILVER BUCKLE MNG CO</b> Box 1000, Wallace Pres: Dr F E Scott VP & Gen Mgr: Clark L Wilson Sec: Alton Hall Treas: Jack D Gay <b>SILVER BUCKLE-VINDICATOR</b> PROJECT, Wallace & Mulan, Pb, Ag Idle (See Utah)
<b>PATMASTER, MILES L</b> Box 82, Dixie <b>ESPERANZA MINE</b> , Orogrande dist., Idaho County, placer, Au, Ag Idle	<b>RADIOPRE MNG &amp; EXPLOR CO</b> Box 68, Milton-Freewater, Oregon Pres: Earl C Murray Vt: James O Howton Sec: Henry Kaye MINE, Mineral Hill Mng dist., Blaine County Under devel	<b>SALMON RIVER SCHEELITE</b> CORP Clayton Pres: Harvey Penney Vt: Larry F Nunnenkamp Sec-Treas & Gen Mgr: James E Clewis Ass't Gen Mgr: Doreen Lemons <b>TUNGSTEN JIM MINE</b> , Clayton, Thompson Cr, undergr., WO <sub>3</sub> Mine Sup: George Wilcox Prod: 40 tons Idle <b>40-TON GRAV MILL</b> , at mine	<b>SILVER DOLLAR MNG CO</b> 909 W Sprague Ave, P O Box 122, Spokane I, Wash Pres: Elmer E Johnson VP: L E Nicholls Sec-Treas: W T Anderson Purch Agt: W J Carlson <b>SILVER DOLLAR MINE</b> , Osburn, undergr., Pb, Ag Geol: P E Oscarson (See Wash & Hayden Hill Cass Mng Co, Idaho)
<b>PATMASTER, INC</b> 61 Payton Bldg, Spokane I, Wash Pres: Frank N Marr Sec: C D Randall MINE, 31 mi SW of Aroo, undergr., Idle	<b>RAINBOW MNG &amp; MLG CO</b> LTD Box 889, Wallace Pres: H C Morey Sec-Treas: W A Callaway <b>RAINBOW SI GROUP</b> , Evolution dist., Cu, Ag, Pb, Zn Under devel by Polaric Mng Co	<b>SALMON RIVER URANIUM</b> DEVELOP INC Box 333, Salmon Pres-Purch Agt: William Wilcox VP: E A Johnsmeyer Sec-Treas: Mary E Wilcox MINE, undergr., open pit, U <sub>3</sub> O <sub>8</sub> , Th, rare earths Under devel	<b>SILVER PIRATE MNG CO</b> P O Box 286, Kellogg Pres: Donald J Diehl VP, Purch Agt & Gen Mgr: Albert M Nash Sec-Treas: Mary A Nash <b>SILVER PIRATE MINE</b> , Kellogg Idle
<b>PENMAN MINE CLAIMS</b> c/o Ross R Brattain, 7800 SE 23rd Way, Mercer Island, Wash	<b>RAMS HORN MNG CO</b> 333 Pte Bldg, Salt Lake City, Utah Pres: W W Murray	<b>SALMON URANIUM &amp; THORIUM</b> CO, INC Mackay Pres: P W Frank VP: Jacob Edens	<b>MINING WORLD</b>

**SILVER STAR MINES**  
840 Bank St., Wallace  
Pres: M D Anderson  
Sec: V C Kingsbury  
**SILVER STAR MINE**  
Under devel  
(See Utah)

**SILVER STAR-QUEENS MINES, INC**  
Box 188, Hailey  
Pres: Garfield Vogel  
VP: Edward B Riley  
Sec-Treas: J F McFadden  
Purch Agt: M F Sabala  
**OLD MINNIE MOORE & QUEEN OF THE HILLS MINES**, 1 mi W of Bellevue, undergr., Pb, Ag, Zn.  
Gen Mgr & Supz: Roy T Flis  
Under devel  
(See Walker Eng Corp)

**SILVER STILL MNG CO**

Weiser  
Pres: Lee Thorson  
VP: Kenneth Steck  
Sec: E W Horner  
**SILVER STILL MINE**, Mineral, 30 mi N of Weiser, Ag, Cu, Pb, Zn  
idle

**SILVER SYNDICATE, INC**

Box 1770, Wallace  
Pres & Gen Mgr: W M Yeaman  
VP: N M Smith  
Sec-Treas: Ray Morrison  
**SILVER SYNDICATE MINE**, 10 mi from Wallace, undergr., Au, Cu, Pb, Zn, Ag  
Operated by Sunbeam Mng Co

**SIMI, HUGO A**

Cobalt  
TIM CUP, Yellow Jacket dist., Lemhi County, Au, Ag, Cu, Pb, Zn

**J R SIMPLOT CO**

Continental Bank Bldg, Boise  
Pres: J R Simplot  
VP: W Grant Kilbourne  
Treas: John M Dahl  
Sec & Atty: Lloyd E Haight  
Mgr of Mines: George A McHugh  
Staff Geol: Joe Jammett, S A Robinson  
Asst Mgr Explor Div: C W Sweet  
Pres: P T Peterson  
Dir Mine Oper: O E Pothier  
Mine Supz: Ray Bowden  
Mine Eng: John Clouser  
Mine Frm: Tom Hughes  
Prod: 6,000 tons

**FERTILIZER DIV**, Box 912, Pocatello  
Gen Mgr: W Grant Kilbourne  
**GAY MINE**, near Fort Hall, open pit, phosphate  
Res Mgr: P T Peterson  
Dir Mine Oper: O E Pothier  
Mine Supz: Ray Bowden  
Mine Eng: John Clouser  
Mine Frm: Tom Hughes  
Prod: 6,000 tons

**FERTILIZER PLANT**, Pocatello  
Plant Eng: R L Long  
Chem Eng: Oscar C Finkelberg  
Auditor: William Hahn  
**FLUORSPAR DIV**, Challis  
inactive  
(See Mont, Nev, Wyo & Warren  
Dredging Corp in Idaho)

**SMITH, JOHN E**

Inkem  
**WORTHING MINE**, Lemhi County, Ag, Cu, Pb, Zn  
idle

**SMITH - MURPHY LEASE**  
151 - 1/2 King St., Wallace  
**OROFINO DUMP MINE**, Summit dist., Shoshone County, Ag, Pb, Zn  
idle

**SMITH, ARTHUR T**  
Boise  
**BUCK CREEK MINE**, Elmore County  
Columbian, Tantalum

**SMOTHERS, A P**

Shoup  
**ELKHORN BAR PLACER**, 52 mi W of Shoup, dragline placer, Au, rare earths  
idle

**BROKEN HALTER MINE**, 50 mi W of Shoup, undergr & surface, CaF<sub>2</sub>  
idle

**SNOOSE MNG CO**

219 N 17th St., Boise  
Pres: W F Smith  
VP: Mrs A M Jensen  
Sec-Treas: R S Bacon  
**SNOOSE MINE**, 2 1/2 mi SE of Hailey, undergr., Zn, Pb, Ag  
idle

**SOLAR-X-CORPORATION**  
8045 Ustick Rd., Boise  
Pres: Kenneth Arnold  
VP: Doyle Symms  
Sec: Gus Pearson  
**STEENS URANIUM MINE**, undergr., open pit, U<sub>3</sub>O<sub>8</sub>  
Under devel

**SPIDER URANIUM MNG CO INC**

6 Her Bldg, Pocatello  
VP: Wm E Westergard  
**CLAIMS**, Bannock County near Pocatello, Pb, Ag  
idle  
**CLAIMS**, in Utah  
(See Utah)

**SPokane-IDaho MNG CO**  
61 Peyton Bldg, Spokane I, Wash  
Pres: Frank N Marr  
Sec: C D Randall  
Treas: Charles E Marr, Jr  
**CONSTITUTION MINE**, 8 1/2 mi SE of Pinchurst, undergr., Zn, Pb  
idle

**SQUAW PEAK MINE**

McCall  
Partners: F B Frasier, S L Frasier  
R J Frasier & A R Roger  
**MINE**, 25 mi N of McCall, undergr & surface, Au, Pb, Zn, Ag, Cu, U<sub>3</sub>O<sub>8</sub>  
Supz & Mgr: G W Frasier, Weiser  
idle

**STRAK, LESTER J**

Elik City  
**CROOKED RIVER MINE**, Elk City dist., Idaho County, placer, Au, Ag  
Under devel  
**BLUE MOON MINE**, Idaho County, Au, Ag  
idle

**SUCCESS MNG CO**

Wallace  
Pres: Henry L Day  
**SUCCESS MINE**, Wallace, Zn, Pb  
idle

**SULLIVAN MNG CO**

Bradley  
**STAR MINE**, Hunter Dist, Shoshone County, Ag, Cu, Pb  
Under devel

**SUNGOLD MINES, INC**  
711 Hutton Bldg, Spokane, Wash  
Pres & Mgr: W T Putman  
**SUNGOLD MINE**, Grangeville, undergr, Au  
idle  
See Wash

**SUNSET LEASE**

Day Bldg, Wallace  
Gen Supz: R Farmin  
**SUNSET MINE**, 10 mi N of Wallace, undergr., Zn, Pb  
Under devel

**SUNSET MINES, INC**

Box 889, Kellogg  
Pres: O Bardsah  
VP: David Harvey  
Sec: C B Merritt  
**LIBERAL KING MINE**, 11 mi W of Kellogg, undergr., Zn, Pb, Ag, Au  
Gen Mgr: R E Loman  
125-TON FLOT MILL, at mine

**SUNSHINE CONS, INC**

102 Sidney Bldg, Kellogg  
pres: W M Yeaman  
VP: Ray Morrison  
Sec & Treas: F E Marler, Jr  
Gen Mgr: N M Smith  
**SUNSHINE CONS MINE**, 6 mi E of Kellogg, undergr., Ag  
(Under devel by Sunshine Mng Co)

**SUNSHINE MNG CO**

738 Peyton Bldg, Spokane I, Wash  
Pres: Robert Hardy, Jr  
VP: C M Hull  
Sec-Treas: Frank M Hardy  
Asst Sec: Stanton B Bennett  
Asst Treas: Vincent P Whelan  
Purch Agt: N J Osborne  
Mgr, Min Div: John Edgar  
Mgr, Petroleum Div: A P Wynn  
**SUNSHINE MINE**, Box 1060, Kellogg, undergr., Ag, Pb, Cu, Zn  
Mgr: H B Johnson

Ch Geol: James B Colson  
Ch Eng: James C Durham  
Mfg Frm: Charles A Angle  
Prod: 750 tons  
1,000-TON FLOT MILL  
Mill Supz: Franklin H Sharp

Asst Mill Supz: Leon N Barr  
Mill Frm: Lyte Cornell  
Antimony Plant Frm: Harold Palmer  
**SILVER SYNDICATE MINE**  
(See Silver Syn Mng Co)  
**SUNSHINE COB MINE**  
(See Sunshine Cons)  
(See Utah & Fairview Placers, Calif)  
(See Ariz, Wash)

**SUN VALLEY LEAD-SILVER MINES, INC**

Ketchum  
Pres: Arthur Swanson  
VP: L O Lindberg  
Sec-Treas & Gen Mgr: J R Thornton  
**MINE**, undergr  
Supz: Fred Lease  
idle  
100-TON FLOT MILL, Ketchum  
Supz: George Stokes

**SUN VALLEY MNG CORP**

136 S Locust St, Jerome  
Gen Mgr & VP: John Owen  
Gen Supz: E A Yodon  
Geol: Joe Shipment  
Met: Mark G Smerchanski  
Sec-Treas: Louise M Lindsey  
**MINE**, Hailey, Ag, As, Zn, Pb  
undergr  
Mine Supz: Emmett Yadon  
Mine Eng: Mark G Smerchanski  
idle  
15-TON MILL

**TALACHE MINES, INC**

111 Grove St, Box 2088, Boise  
Pres: A H Burroughs, Jr  
VP: B K Burroughs  
Sec: W A Giffin  
**BOISE-ROCHESTER, MORARCH & LAST CHANCE MINES**, Atlanta, undergr, As, Ag  
Gen Mgr: A H Burroughs, Jr  
Under devel  
400-TON FLOT MILL

**TAYLOR, IVAN J**

Ketchum  
PHI KAPPA LEASE, Blain County, Au, Ag, Cu, Pb, Zn  
Under devel

**TAYLOR & PRITCHETT**

Box 537, Mackay  
**CHAMPION MINE**, Alder Cr dist, Custer County, Ag, Cu, Pb  
Under devel

**TEMPLE MOUNTAIN URANIUM CO**

39 Exchange Place, Rm 23, Salt Lake City, Utah  
Pres: Herman Heinecke  
VP: George Heinecke  
Sec: Augustus Reeves  
**CHALLIS VIEW MINE**, Challis, Pb, Ag  
Gen Mgr: Herman Heinecke  
Asst Gen Mgr: George Heinecke  
Geol: B E Grant  
idle  
(See Utah)

**TREASUREMENT MNG CO**

1129 10th Ave N, Seattle, Wash  
Pres & Gen Mgr: W J Logus  
Sec & Treas: M A Logus  
**QUIGLEY MINE**, 6 1/2 mi E of Hailey, undergr, Pb, Ag  
Geol: James M McDonald  
Mine Supz: Al Linderman  
idle

**TRIUMPH MNG CO**

Triumph  
Pres: J W Sweet  
VP: E H Snyder  
Sec-Treas: John W Hamilton  
Purch Agt: L K Van Sickie  
**TRIUMPH MINE**, Triumph, undergr, Pb, Ag, Zn  
Gen Mgr: L M Robinson  
Elec Eng: James B Deering  
Ch Eng & Acting Mine Supz: J M Barrett  
Prod: 300 tons  
Under devel  
300-TON FLOT MILL, Triumph

**TWIN RIVERS, INC**

Riggins  
Pres & Gen Mgr: Bill White  
Sec-Treas: Max Maynard  
**GOLDEN RULE MINE**, Warren, placer, Au, Ag, Monasite  
Asst Gen Mgr: Rex Winters  
idle

**UNITED IDAHO MNG CO**

808 Newhouse Bldg, Salt Lake City, Utah  
Pres & Gen Mgr: Roger V Pierce  
**UNITED IDAHO MINE**, Gilmore, undergr, Pb, Ag  
idle

**URANIUM EXPLORATION CORP OF IDAHO**

281 Main Ave E, Twin Falls  
Pres: Bert A Sweet, Sr  
VP: Bert Sweet, Jr  
Sec-Treas: Leonard Mauss  
Purch Agt & Mine Supz:  
Revere  
PARK CANYON MINE, Twin Falls, 27 mi from Ketchum, undergr, surface, U<sub>3</sub>O<sub>8</sub>  
Under devel

**VENDETTA CHIEF MNG CO**

Murray  
Pres: Maynard H McPhee  
VP: Florence Lillie  
Sec-Treas: Helen C McPhee  
**MINE**, Murray, Pb, Ag  
Gen Mgr: Chas U Burnell  
idle

**VINDICATOR SILVER-LEAD MNG CO**

Wallace  
Pres: W J Logus  
VP: Mrs A M Logdon  
Sec-Treas: H F Magnuson  
**VINDICATOR MINE**, 2 mi E of Mullan, undergr, Pb, Ag, Zn  
Under devel

**WAKEMAN, J Q**

1417 N 5th St, Boise  
**MINE**, Elmore County, placer, Au, Ag  
idle

**WALKER ENGR CORP**

612 Dooley Bldg, Salt Lake City, I, Utah  
Pres: W J Walker  
VP: R T Walker, Jr  
Sec: Belle T Walker  
**MINNIE MOORE MINE**, Blaine County, undergr  
(Under lease to Silver Star-Queens Mines, Inc, Idaho)  
(See Colo, Utah)

**WALKER, JOHN M**

3625 18th St, Lewiston  
**RUBY CREEK**, Ruby Creek dist, Clearwater County, Au, Ag, Cu, Pb, Zn  
Under devel

**WALL & HEATH**  
Box 117, Fairfield  
**CAMAS COUNTY DIATOMITE MINE**, open pit, Diatomite  
idle

**WAR EAGLE MNG CO, INC**

114 E Chestnut St, Yakima, Wash  
**WAR EAGLE MINE**, McCall, undergr, Au, Ag  
Gen Mgr: E W Petersen  
idle  
75-TON HEAVY MEDIA MILL, McCall  
(See Wash)

**WARREN DREDGING CORP**

J R SIMPLOT CO SUBSIDY  
Boise  
Pres: J R Simplot  
VP: L E Haight  
Sec-Treas: John M Dahl  
(See J R Simplot, Idaho)

**WASATCH MNG & DEVEL CO**

Preston  
**MINE**, Bear Lake County, Id  
Under devel

**WEST STAR MNG CO**

1221 Sixth, Coeur d'Alene  
Pres: K H Blaeser  
VP: Chase U Burnell  
Sec: Julia M Hughes  
Treas: A Burnell  
**WEST STAR MINE**, Box 8, Gem, undergr, Pb, Ag, Zn, Au  
Gen Mgr: A Markwell  
idle

**WESTERN CONS MINES, INC**

Box 1600, Eastman Bldg, Boise  
Pres & Gen Mgr: Gene Jack  
VP: John F Miller  
Sec & Treas: B M Andrews  
Gen Supz: E Albrecht  
**OPHIR MINE**, Rocky Bar, undergr, Au, Ag  
idle  
50-TON FLOT MILL

**WESTERN STATES MINES INC**

Box 1, Council  
Pres: H M Kleinenschmidt  
VP: H G Kleinenschmidt

## Illinois

Sec-Treas: Carl H Swanson  
PLACER BASIN GROUP, CARBONATE  
HILL GROUP, PEACOCK GROUP,  
BLUE JACKET GROUP, Gypsum,  
undergr., open pit, Cu, Ag, Au,  
WO<sub>3</sub>  
Under devel

WHELCHL MINES CO  
1019 Arthur St, Caldwell  
Pres: William E Whelchel  
VP: Ralph A Whelchel  
Sec-Treas: Thressa M Whelchel  
TWIN BUTTES GROUP #1, Owyhee  
County, Box 7, Caldwell, rare  
earth, gypsum  
Under devel

WHITE BROS LEASE  
c/o B W White, 83 Star Route,  
Kodiak  
LIBERAL KING MINE, Shoshone  
County, Au, Ag, Cu, Pb, Zn  
Idle

WHITEDELPH EXTENSION  
MNG CO  
421 Michigan St, Sandpoint  
Pres: E F Abramoff  
VP: E N Welo  
Sec-Treas: Oscar M Welo  
WHITE DELPH EXTENSION MINE,  
Clarkfork, undergr., Ag, Pb  
Gen Mgr: Sven A Anderson  
Idle

WHITEDELPH MNG & DEVEL  
CO  
Clarks Fork  
Pres & Mgr: Compton I White, Jr  
VP: W W Cannon  
Sec: E I Fisher  
WHITEDELPH MINE, 2 mi N of  
Clarks Fork, undergr., Ag, Pb, Au, Zn  
Under devel  
SO-TON FLOT MILL

WHITE KNOB MNG CO  
Newhouse Bldg, Salt Lake City,  
Utah  
Pres: O A Glaser  
HOMESTAKE, COPPER QUEEN  
MINES, Alder Creek, Mackay,  
Pb, Zn, Ag

WILBERT MINING CO  
316 Kearns Bldg, Salt Lake City,  
Utah  
Pres & Treas: R J Hogan  
VP: M F O'Reilly  
Sec: Claude Engberg  
DAISY BLACK GROUP, 35 mi E of  
Howe, undergr., Pb, Zn  
Idle  
75-TON CONC  
Idle

WILCOX, G & W CLUTIS  
Dayton  
. ELLIS GROUP, Bayhorse dist.,  
Custer County, Au, Ag, Cu, Pb, Zn

WILSON, E S  
Dobson  
HARD ROCK MINE, Clark County, Ne  
Idle

WILSON, S P  
Timberack  
BURNET ROCK, Adams County, Ma

WINDMAISER, FRANK  
Golden  
MOORE CREEK MINE, Idaho County,  
Idaho  
Idle

YOUNG, RULON  
Salmon  
GRANDVIEW #1 & 2, Lemhi County,  
Au, Ag, Cu  
POPE SHENON DUMP MINE, Bureda  
dist, Lemhi County, Cu, Ag, Au

ZANETTI BROS  
Wallace  
BIG CREEK, OSBURN & DeBLOCK  
TAILINGS, Evolution dist, Shoshone  
County, Ag, Pb, Zn, Cu  
Under devel

ZOOK, JOE E  
Leader  
RAINBOW MINE, Ada County, Au, Ag,  
Cu, Pb  
Idle

## ILLINOIS

ALUMINUM CO OF AMERICA  
Alcoa Bldg, Pittsburgh 19, Pa  
Pres: F L Magee  
VP/Mng Div: L Litchfield, Jr  
FAIRVIEW-BLUE DIGGINGS  
Business  
Gen Sup: P E Steele  
Geol: P E Williams  
Mech Eng: H E Einer  
Met: W C Lay  
Purch Agt: T H Fallwell  
MINE, undergr., CaF<sub>2</sub>, Pb, Zn  
Mine Supt: W H Harrison, Jr  
Mine Frm: L Billington  
Chief Eng: S G Bowman  
Mine Eng: Roy H Gammeter, Jr  
Prod: 400 tons  
HMS FLOT MILL, at mine  
Mill Supt: W C Lay  
Ass't Supt: T K Loyd  
(See Ark, Penn)

AMERICAN COLLOID CO  
Merchandise Mart Plaza  
Chicago 54  
Pres & Gen Mgr: Paul Bechner  
VP & Treas: W D Weaver  
VP: E P Weaver  
VP: Clyde A Sanders  
Ass't Sec: Jeanette Salmon  
Purch Agt: Roy H Harris  
(See Miss, S Dak, Wyo)

AMERICAN SMELTING &  
REFINING CO  
Federal

FEDERAL SMELTER, Pb  
Mgr: L J Buck  
Supt: James H Vose  
(See Ariz, Calif, Colo, Idaho, Kans,  
Md, Mont, Neb, N J, N Mex, N Y,  
Okla, Tex, Utah, Wash and Federal  
Mining & Smelting Co, Mo)

AMERICAN ZINC CO OF  
ILLINOIS (Subsid of AMERICAN  
ZINC, LEAD & SMELT CO)  
1515 Paul Brown Bldg, St Louis 1,  
Missouri

SMELTER, Fairmont City, Roasting  
& by-product plant  
VP & Gen Mgr: G L Spencer, Jr  
Gen Supt: George Kromen  
Purch Agt: G E James  
ELECTROLYTIC SMELTER, Monsanto  
Mgr: L P Davidson  
Gen Supt: T I Moore  
Purch Agt: V M Provost  
Prod: 54,000 tons hi-grade slab  
zinc annually

SMELTING & PROCESSING PLANT,  
Billings  
Mgr: H R Wampler  
Met/Div Supt: J F Clark  
Gen Frm: H J Collett  
Oxide Supt: Oscar Hassel  
Assay: Orville Rutledge  
Prod: 12,800 tons Amer prod zinc  
oxide yrly  
2,700 tons Fr prod zinc oxide  
yrly  
7,150 tons slab zinc yrly  
(See Ariz, Mo, Ohio, Okla, Tenn,  
Tex, Wash, Wisc)

CALUMET & HECLA, INC  
People's Gas Bldg, 123 S  
Michigan Ave, Chicago 3  
Exec VP: H Y Bassett  
(See Mich, N Mex)

EAGLE PITCHER CO, MNG &  
SMELTING DIV  
Box 1040, Galena  
GRAHAM MINE, Galena, undergr.,  
Zn, Pb  
Gen Mgr: R L Haffner  
Gen Supt: H H Haman  
Geol: Wm J Arnold  
Met: Albert Thayer  
Maint Supt: T A Bay  
Maint Frm: Clarence Lyden  
Mine Supt: E L Houy  
Mine Frm: Harold Wisco  
Mine Eng: H B Farrey  
Prod: 1,800 tons

GRAHAM MILL, Galena, flot & grav  
Mill Supt: C C Crow  
Mill Frm: Glen Brotsman  
Assayers: Ed O'Neil & Richard  
Simmons  
Prod: 1,800 tons of Zn daily  
(See Kans, Nev, Ohio, Okla, Wisc)

GOOSE CREEK MNG CO  
10 Public Square, Belleville  
Sec-Treas: D Blair  
Mine, near Cave in Rock, CaF<sub>2</sub>

## HICKORY HILL MNG CO

Gaines  
MINE, Pb, Zn

HOED MNG CO  
Cave-in-Rock  
Pres: P A Hill  
VP: B W Bales  
Sec-Treas & Gen Mgr: Lowell Oxford  
HOED MINE, undergr., CaF<sub>2</sub>, Pb, Zn  
Gen Supt: Ray Crab

INLAND STEEL CO  
First Nat'l Bank Bldg, Chicago 3  
Pres: Joseph Block  
VP, Raw Materials: P D Block, Jr  
Sec: Graydon Megan  
Treas: W H Lovell  
(See Ky, Mich, Minn)

INTERNAT'L MINERALS  
& CHEMICAL CORP  
CONSOLIDATED  
20 N Wacker Dr, Chicago 6

Pres: Louis Ware  
VP, Ind Min Div: Norman J Dunbeck  
Mngr, Consol Fluorspar Dept: E W  
Koenig  
Ass't Mgr: Phil Bisavich, Jr  
VP's: G W Moyers, M H Lockwood,  
P D Manning, George  
Hamilton, N J Dunbeck,  
Howard F Roderick, H C White  
VP & Treas: A R Cahill  
VP & Gen Counsel: E D McDougal, Jr  
Admin VP: T M Ware  
Corp Sec: C M Edwards  
Purch Agt: J P Burrows  
(See Ariz, Colo, Fla, Me, Miss,  
N Mex, N C, Ohio, S D, Tenn, Va,  
Wyo)

MATTHIESSEN & HEGLER  
ZINC CO  
LaSalle

LaSALLE WORKS, Zn  
Pres: H D Carus  
VP & Gen Mgr: C R MacBrayne  
Sec: H H Carus  
Treas: H D Carus  
Gen Supt: R Waskowiak  
Mech Eng: H Larson  
Safety Engr: V Novak  
Purch Engr: A La Flamme  
SMELTER (Retort)  
Capacity: 32,000 tons Zn per yr

MINERVA OIL CO

MINERVA OIL CO, FLUOR.  
SPAR DIV  
Div'n Off: Myers Bldg, Box 531  
Elkhorn

VP & Gen Mgr: Gill Montgomery  
Pur Agt & Supt: S J Kelly  
MINERVA MINE NO 1, Cave-in-Rock,  
undergr., CaF<sub>2</sub>, ZnS  
Mine Supt: C F Callahan  
Mine Frm: James Charlton  
Eng: D B Holbrook  
Mng Eng: J J Daly  
Geol: Donald W Saxby  
Prod: 320 tons per day  
250-TON FLOT MILL: CaF<sub>2</sub>, Zn conc  
Mill Supt: Wm Rule  
Chem: C B Rash  
Assayer: A C Reed  
CRYSTAL MINE, Rt 1, Elizabethtown,  
undergr., CaF<sub>2</sub>  
Plant Mgr: I V Robertson  
Mine Frm: Raymond Dutton  
Prod: 500 tons per day  
750-TON HMS and FLOT MILL,  
met, grade & acid grade fluor spar;  
Crystal mill: Acid & Ceramic & met  
fluor spar; zinc & lead concentrate  
Mill Frm: Jas Frailey  
Met: D C Spence  
VICTORY MINE, Rt 1, Elizabethtown,  
undergr., CaF<sub>2</sub>  
Idle  
JEFFERSON MINE, Rt 4, Golconda,  
undergr., CaF<sub>2</sub>  
Mine Frm: Ray Stone  
Prod: 80 tons per day  
ROSE CREEK MINE, near Herod,  
undergr., CaF<sub>2</sub>  
Idle  
(See Min)

## MORTON SALT CO

120 S LaSalle, Chicago 3

Pres: Daniel P Rice, Jr  
VP: H R Stratford  
VP, Prod: R C Vall  
Sec: L M McBride  
Treas: Garfield King  
Purch Agt: H L Estes  
(See Kan, La, Tex)

## NEW JERSEY ZINC CO, THE

Box 129, Harristburg

Res Geol: R C Bling  
(See: Colo, N J, N Mex, N Y, Pa,  
Tenn, Va, Wisc)

## OZARK - MAHONING CO.

MNG DIV  
Box 57, Rosiclare

Pres: C O Anderson  
VP & Gen Mgr: A G Johnson  
Purch Agt: C W Schosky  
DEARDORFF, W L Davies #2,  
North Green, East Green,  
Mahonning Mines, Shaft #2,  
3, 5, 11, 16 & Hill-Ledford,  
undergr., fluor spar, Zn, Pb  
Mine Supt: Edward Powell, Jr  
Asst Mine Supt: Wm H Melcher  
Mine Frm: J H Scott, J L Price  
Prod: 500 tons  
500-TON FLOT MILL, at mine  
Mill Supt: W W Fowler  
Asst Mill Supt: R H Herman  
Mill Frm: P N Hobbs  
Assay: Wm Smith  
(See Colo, N Mex, Okla)

## ROSLICLARE LEAD & FLUORSPAR MNG CO

Rosiclare  
Pres: J Blecheisen  
VP: Stanley Holland  
Sec-Treas: A T Souder  
Cashier: R A Browning  
MINE, undergr., fluor spar  
Prod: 300 tons  
300-TON FLOT MILL, at mine  
(Leased to Wiley Cochren, M L Conn  
& Ted Joiner)  
(See Ky)

## SO ILINOIS MNG CO

Rte 4, Golconda  
Pres: H Evan Roberts

JEFFERSON-HUMM MINE, 8 mi W  
of Rosiclare, fluor spar, undergr  
Gen Mgr: Adrian Dorenfield  
Gen Supt: Rob O'Brien  
Geol: R Kellogg  
Prod: 75 tons

100-TON HEAV-MEDIA MILL, at  
mine

DOUGLAS MINE, Pop Co, CaF<sub>2</sub>

Prod: 50 tons

REDD MNG CO  
R F D, Golconda

HAMP MINES, northern Hardin

County, CaF<sub>2</sub>

SWIFT & CO  
Union Stock Yards, Chicago  
(See Fin)

## TAMORA MNG CO

Rosiclare  
MINE, Pope County, CaF<sub>2</sub>

TRI - STATE ZINC, INC  
123 Williams St, New York 38,  
N Y

Pres: R F Playter  
VP: V C Allen  
Sec-Treas: J H Nicholls  
GRAY MINE OPERATION, Galena,  
undergr., Zn, Pb

Gen Mgr: V C Allen  
Geol: Paul Herbert, Jr  
Mine Supt: Joseph J Nolan  
Mine Frm: Orville W Lickles  
Mine Eng: R J Kuehne  
Prod: 1,600 tons

1,000-TON FLOT-GRAV MILL,  
Galena  
Mill Supt: Dorsey E Hammock  
(See N Y, Va)

## U S GYPSUM CO

300 W Adams St, Chicago 6

Chrm Bd: C H Shaver  
Pres: O M Knode  
VP, Op: E Rembert  
VP, Manufact: C W Desgrey  
VP, Purch: C H Bear

Sec-Treas: F L Stellner  
Mngr Mines: F C Appleyard  
(See Calif, Colo, Conn, Ind, Iowa,  
Mass, Mich, Mont, Nev, N Mex,  
N Y, Ohio, Okla, Tex, Utah, Va)

## VICTOR CHEMICAL WORKS

155 N Wacker Dr, Chicago 6

Pres: Roth Weigel  
VP: F M Anable, T G Everett,  
M R Stanley  
Sec: F W Hansen  
Treas: F S Schwert  
Purch Agt: M E Jones  
(See Fla, Mont)

## ZONOLITE CO

135 LaSalle St, Chicago

Pres: John B Myers  
VP: Dayton L Prouty, Daniel J Boone,  
A Joe Kelley, Robert W Sterrett  
VP & Treas: Walter J Bain  
Sec: J H Bishop  
Purch Agt: Leo O Prans  
(See Mont)

**INDIANA****NATIONAL GYPSUM CO**

325 Delaware Ave, Buffalo 3, N.Y.  
MINE, Shoals, undergr., gypsum  
Pl Mgr: M B Turner  
Mine Supt: Max Abrams  
Prod: 1,300 tons  
MILL, at mine  
(See Iowa, Kan, Mich, N.Y., Ohio,  
Pa., Tex., Va.)

**U S GYPSUM CO**

300 W Adams St, Chicago 6, Ill  
MINE, Shoals, undergr., gypsum  
Works Mgr: J R Burns  
(See Calif., Colo., Conn., Ill., Iowa,  
Mass., Mich., Mont., Nev., N.Mex.,  
N.Y., Ohio, Okla., Tex., Utah, Va.)

**IOWA****BALD MOUNTAIN MNG CO**

Clyton  
Pres: O D Collins  
Sec-Treas: W H Reidel  
(See S.D.)

**BESTWALL GYPSUM CO**

Fort Dodge  
MINE & PLANT, gypsum  
(See Kansas, Mich, N.Y., Pa., Tex.,  
Utah)

**FORT DODGE GYPSUM CO**

Fort Dodge  
NO I MINE, gypsum

**NAT'L GYPSUM CO**

Fort Dodge  
QUARRY & PLANT, gypsum  
Plant Mgr: J B Pitts, Jr  
Mine Supt: Wm. Canney  
Prod: 1,000 tons  
(See Ind., Kan, Mich, N.Y., Ohio, Pa.,  
Tex., Va.)

**NORTHWEST GYPSUM CO**

Fort Dodge

**U S GYPSUM CO**  
300 W Adams St, Chicago 6, Ill  
**OPEN QUARRY**, Ft Dodge, gypsum  
Works Mgr: M E Davidson  
(See Calif., Colo., Conn., Ill., Ind., Mass.,  
Mich., Mont., Nev., N.Mex., N.Y., Ohio,  
Okla., Tex., Utah, Va.)

**KANSAS****AMERICAN ROCK CRUSHER CO**

3700 Rainbow Blvd, Rosedale,  
Kansas City 3  
Pres: F M Tobin  
VP & Sec: P A O'Rourke  
Treas: F M Tobin  
UNDERGR WORKINGS, limestone  
Mine Supt: J C Williamson

**AMERICAN SALT CORP**

630 N W Life Bldg, Kansas City 6,  
Mo.  
SALT MINE, Lyons, undergr., evapor

**AMER SMELT & REFIN CO**

Baxter Springs  
Gen Supt: W C Ball  
Mine, undergr., Zn, Pb  
Idle  
(See Ariz., Calif., Colo., Idaho, Ill., Md.,  
Mont., Nebr., N.J., N.Mex., N.Y., Tex.,  
Utah, Wash., & Federal Mng & Smelting  
Co., Mo.)

**BARTON SALT CO**

Hutchinson  
Pres: C H Humphreys  
VP: R S Humphreys  
Sec: G R Allan  
Treas: Elizabeth H Summers  
SALT MINE, Evaporated  
Plant Mgr: R C Lindell

**BESTWALL GYPSUM CO**

120 E Lancaster Ave, Ardmore, Pa  
MINE, Blue Rapids, undergr., gypsum  
(See Iowa, Mich, N.Y., Pa., Tex., Utah)

**BROWN MNG CO**

1734 Park Ave, Baxter Springs  
MINE, 1 mi W of Baxter, undergr.,  
Zn, Pb  
Idle

**C & M MINING CO**

Box 228, Baxter Springs  
Supt: H G Milligan  
ST LOUIS #4, IMBEAU MINES,  
undergr., Zn, Pb  
200-TON GRAV-FLOT MILL  
Idle

**CAREY SALT CO**

Box 913, Hutchinson  
Pres: H J Carey, Jr  
VP: W D P Carey  
Sec: D P Johnson  
Treas: R N Apple  
Purch Agt: F L Johnson  
MINE, Hutchinson, undergr., salt  
Gen Mgr: Lee Reid  
Mech Eng: Ron Stone  
Mine Supt: Everett Roberts  
Prod: 1,000 tons  
MILL, Hutchinson  
Mill Supt: C Millard  
(See La.)

**CASSELL MNG CO**

611 Sergeant Ave, Joplin, Mo  
Gen Mgr: J W Atherton  
MINE, SE of Baxter Springs, undergr.,  
Zn, Pb  
(Formerly Ajax Mng Co)

**COLLINS & THOMAS**

Commerce  
MINE, 1/4 mi N of Treese,  
undergr., Zn, Pb  
(Formerly Shearer Mng Co)

**EAGLE PITCHER CO, MNG &  
SMELT DIV**

Cardin, Okla  
LUCKY JEW, BIO JOHN BILHARZ,  
GRACE B, WEBBER, WESTSIDE,  
Zn, Pb  
LEAD SMELTER & ACID PLANT,  
Galena  
Mgr: Fred Cleerman  
(See Ill., Nev., Ohio, Okla., Wisc.)

**GARNETT ROCK CO**

Garnett  
Own: E F Bronahan  
UNDERGR WORKINGS, limestone

**GOLDEN ROD #24**

Box 41, Cardin, Okla  
MINE, 3/4 mi W of Hwy #66, Pb, Zn

**HELEN H MINING CO**

Box 326, Baxter Springs  
Mgr: Claude Jones  
MINES, Baxter Springs, Kans &  
Pitcher-Cardin, Okla areas, undergr.,  
Zn, Pb

**INDEPENDENT SALT CO**

4115 Packers Ave, Chicago, Ill  
SALT MINE, Kanopolis, undergr.

**O W KERFORD QUARRY CO**

Rt 1, Atchison  
UNDERGR WORKINGS, limestone

**LITTLE BEA MNG CO**

c/o Kenneth Childress,  
Box 229, Baxter Springs  
MINE, 2 mi SW of Baxter, Pb, Zn

**LORING QUARRIES CORP**

Bonner Springs  
UNDERGR WORKINGS, Loring

**MARK TWAIN MNG CO**

Picher, Okla  
Sup: Harold Childress  
MINE, undergr., Zn, Pb  
Idle

**MASON MNG CO**

1918 Park, Baxter Springs  
MINE, 1 mi W of Baxter, undergr.,  
Zn, Pb  
Idle

**McCoy & CAREY MNG CO**

612 S River St, Picher, Okla  
MINE, 2 mi SW of Baxter, Pb, Zn  
Idle

**MID-CONTINENT LEAD &**

ZINC CO  
1101-1/2 Military, Baxter Springs  
Pres: Kenneth Childress

MINES, WRIGHT LAND GROUP AND  
JARRETT MINE  
Idle

**MORTON SALT CO**

120 S La Salle, Chicago 3, Ill  
SALT MINE, Hutchinson, evapor  
(See Ill., La., Tex.)

**NANCY JUNE MNG CO**

Box 14, Baxter Springs  
Supt: W E Grayson  
ROBERTSON MINE, 11 mi W of  
Baxter, undergr., Zn, Pb  
Idle

**NATIONAL LEAD CO**

Box 30, Baxter Springs  
TRI STATE OPERATIONS  
Gen Supt: Geo R Schaefer  
Met: Corbin Marsh  
BALLARD, HARTLEY, SHANKS,  
KEITH, SWALLEY, SMITH, CLARK  
MINES, undergr., Pb, Zn  
Prod: 2,600 tons  
3,300-TON GRAV-FLOT MILL  
Mill Supt: Jay Shoemaker  
(See Ill., La., Mo., Nebr.,  
N.Y., Tenn., Tex., Wyo.)

**NAT'L GYPSUM CO**

Medicine Lodge  
MINE & PLANT, gypsum  
Plant Mgr: D C Chads  
Mine Supt: Brad Saboda  
Prod: 1,000 tons  
(See Ind., Iowa, Mich, N.Y., Ohio, Pa.,  
Tex., Va.)

**RACE TRACK MNG CO**

Box 29, Baxter Springs  
Supt: Rex Craig  
MINE, W of Baxter, undergr., Zn, Pb  
Idle

**SEACRY & HENDERSON MNG CO**

Box 281, Picher, Okla  
BENDELARI MINE, NW of Picher,  
undergr., Zn, Pb  
WILBUR MINE, Near Treese,  
undergr., Zn, Pb  
Sup: D W Searcy

**SILVER STREAK CO**

Baxter Springs  
Own: Mr Zuvekas  
MINE & MILL, 1 mi S of Baxter

**THOMPSON STRAUSS**

QUARRIES  
Rt 2, Kansas City 6  
MINE, Morris, undergr., limestone

**THUNDERBIRD MNG CO**

Rte 1, Box 95, Baxter Springs  
Supt: Clyde Hopkins  
MINE, 1 mi W of Baxter, Pb, Zn  
(Subleased from Mason Mng Co)

**W M & W MNG CO, INC**

Box 366, Picher, Okla  
Pres: O K Tucker  
VP: F E Williams  
Sec & Treas: Ralph Chambers  
Purch Agt: O K Tucker

**KENTUCKY****INLAND STEEL CO**

Marion  
FLUORSPAR OPER  
Supt: W G Robinson  
(See Ill., Mich, Minn.)

**KENTUCKY FLUORSPAR CO**

Marion  
Pres: R N Fraser  
VP: Frank Stegeman  
Sec-Treas: Sam Gugenheim  
Purch Agt: E W Fraser  
TWO 100-TON FLOT MILLS, Marion  
TWO 5-TON HEAV-MED MILLS,  
Marion  
Mill Supt: E W Fraser

**KING CONSTRUCTION CO**

Rte 4, Columbus  
Supt: Mr Wood  
OLD QUEEN ESTHER MINE, 1 mi  
S, 2 mi W of Baxter, undergr., Zn,  
Pb  
(Formerly Wood & Shira Mng Co)

**LIVINGSTON MNG CO**

PO Box 202, Marion  
Pres: Wm Howard Crider  
VP: Ridge Winter  
Sec-Treas: Howard Stout  
NANCY HANK MINE, Salem, undergr.,  
CaF<sub>2</sub>  
Under devel

**PENNSYLVANIA SALT MNG CO**

Marion  
DYERS HILL SHAFT, undergr., CaF<sub>2</sub>  
MILL, at mine

**ROSICLARE LEAD &**

FLUORSPAR MNG CO  
Rosiclare, Ill  
PIGMY MINE, Crittenden County, undergr.,  
CaF<sub>2</sub>  
Prod: 50-75 tons  
(See Ill.)

**CAREY SALT CO**

Winnfield  
MINE, Winnfield, undergr., salt  
Gen Mgr: W H Cameron  
Supt: Al Tracy  
Mech Eng: J M Thornton  
Mine Frm: J E Austin  
Prod: 600 tons  
MILL, at mine  
(See Kans.)

**FREIGHT SULPHUR CO**

181 E 42nd St, New York 17, N.Y.  
LOUISIANA DIV, Commerce Bldg.,  
New Orleans, mines at Grande  
Cascille, Garden Island Bay, Bay  
St Elain, Chacahoula  
VP & Div Mgr: K T Price  
(See N.Y.)

**RACE TRACK MNG CO**

1409 Whitney Bldg, New Orleans 12  
Pres: E H Walet, Jr  
VP: H A Wilson, F E Lewis

VP & Sec: Charles J Ferry  
VP & Treas: L L Lassalle  
Purch Agt: Carl E McElrath  
VPs: J T Files, E B Miller, H W  
Manley

STARKS DOME, Calcasieu Parish, So  
(See Tex.)

**MORTON SALT CO**

120 S La Salle St, Chicago 3, Ill  
MINE, Weeks  
Gen Mgr: L J Broussard, Jr  
Asst Gen Mgr: Wayne West  
Prod: 1,200 tons  
(See Ill., Kans., Tex.)

**NATIONAL LEAD CO**

New Orleans  
BARITE PLANT, dry grinding  
Plant Supt: D M Middleton  
(See Ark., Calif., Kans., Mont., Mo., Nev.,  
N.Y., Tenn., Tex., Wyo.)

**MAINE****BELL MINERALS CO**

West Paris  
PERHAM MINE, Oxford County,  
feldspar  
Gen Mgr: H W Childs

**INTERN'L MIN & CHEM CORP**

20 N Wacker Dr, Chicago, Ill  
MINES, Sagadahoc County, feldspar  
50-TON MILL, Topsham  
Gen Supt: J C Brannigan  
(See Ariz., Colo., Fla., Ill., Miss.,  
N.Mex., N.C., Ohio, Tenn., Va., Wyo.)

**PENOOSSET MNG CORP**

Harborside, Brooksville  
CAPE ROSEIER MINE, undergr., Cu, Zn  
Gen Mgr: K D Thomson  
Explor

**ROCKLAND-ROCKPORT LIME CO**

Rockland  
Pres: A E Orr  
Gen Supt: H B Kaler  
MINES, Knox County, open pit,  
limestone  
200-TON MILL, Rockland

**TOPSHAM FELDSPAR CO**

Topsham  
Pres: E W Booker  
Gen Supt: D R Durenzo  
TRENTON MINE, Sagadahoc Cty.,  
feldspar, Quarries  
Under devel  
50-TON GRAV MILL, Cathance Rd.,  
Topsham

**MARYLAND****AMERICAN SMELTING & REFINING CO**

Hightland & Eastbourne Aves.,  
Baltimore 24

**BALTIMORE PLANT**

Mgr: A J Kleff, Jr  
(See Ariz., Calif., Colo., Idaho, Ill.,  
Kans., Mont., Nebr., N.J., N.Mex., N.Y.,  
Tex., Utah, Wash., Federal Mng &  
Smelt Co., Mo.)

## Massachusetts — Minnesota

**DAVISON CHEM CORP., THE**  
101 N Charles St, Baltimore 3  
Pres: W E McGuire, Jr  
VPs Gen Mgr, Agric Chem Div:  
D N Huseman  
Asst Gen Mgr, Agric Chem Div:  
J M Harris  
*(See Fla)*

**POWHATAN MNG CO**  
6721 Windsor Mill Rd, Baltimore 7  
Pres & Gen Mgr: F A Mett  
VP & Sec: C Silver  
Treas: E L Farley  
Off Mgr: F E Mett  
15-TON MILL, Woodlawn, Baltimore 7  
Supt: Dennis Smith  
Asst Supt: Charles Liptrap  
*(See Calif, Ga)*

**UNITED CLAY MINES CORP**  
Poplar  
MINE #2, open pit  
Mine Supt: H Michael Breza  
Prod: 100 tons  
50-TON PLOT MILL, at mine  
*(See Fla, Ga, N J, Tenn, SC)*

## MASSACHUSETTS

**COPPER RANGE CO**  
24 Federal St, Boston 10  
Pres: J P Lally  
VP: Nelson J Darling, Jr  
John V O'Connor, Robert H Jacobson, C DeWitt Smith  
Sec: J R Ackroyd  
Treas: D M Goodwin  
Purch Agt: S H Bailey  
*(See Copper Range, Mich, White Pine Copper Co, Mich)*

**U S GYPSUM CO**  
300 W Adams St, Chicago 6, Ill  
MINE, Farmington, open pit, limestone  
Works Mgr: E E Long  
*(See Calif, Cal, Conn, Ill, Ind, Iowa, Mich, Mont, Nev, N Mex, N Y, Ohio, Okla, Tex, Utah, Va)*

**U S SMELTING, REFINING, & MNG CO**  
75 Federal St/Box 2137, Boston  
Pres: F S Mulock  
*(See Alaska, Ariz, N Mex, Utah)*

**WHITE PINE COPPER CO**  
24 Federal St, Boston 10  
Pres: J P Lally  
VP: W P Nicholls, Gen McGrath  
Sec: J R Ackroyd  
Treas: D M Goodwin  
Purch Agt: Russell Baird  
*(See Copper Range Co, Mich & White Pine Copper, Mich)*

## MICHIGAN

**CALUMET & HECLA, INC., CALUMET DIV**  
1 Calumet Ave, Calumet  
VP & Gen Mgr: A S Kromer  
Dir of Purch: W A Bars  
Dir, Ind & Pub Rel: H D Stott  
NO 3 AMHEEK, ALLLOUEZ, CENTENNIAL NO 2, AHMEEK NO 2, PENINSULA, SENECA, Calumet, undergr, Cu  
Dir, Mgr: C A Campbell  
Ch Geol: J P Pollock  
Proj & Eng Mgr: P H Ostendorf  
Mech Proj Eng: R R Spencer  
Elec Proj Eng: A W Hill  
Prod: 8,600 tons  
8,000-TON GRAV-PLOT MILL  
Dir, Mgr: R K Poull  
**CALUMET & HECLA SMELTER**  
Hubbell, 5 reverberatory furnaces  
Dir, Smelting & Ref: K F Farley  
Prod: 90,000,000 lbs Cu yearly  
OSCEOLA NO 6 MINE & NO 13, Calumet, undergr, Cu  
Under devel  
**CENTENNIAL NO 3 MINE**, Calumet, undergr, Cu  
*(See Mich, N Mex, N Y)*

**CLEVELAND-CLIFFS IRON CO., ORE MNG DEPT**  
1460 Union Commerce Bldg, Cleveland 14, Ohio  
**CLIFFS IRON CO.**  
1460 Union Commerce Bldg, Cleveland 14, Ohio

Pres: Walter A Sterling  
Asst to Pres: Grover J Holt  
VP, Mining: C W Allen  
Sec: Robert M Kimmel  
Treas: J P Long  
**MICHIGAN OPER**, Ishpeming  
Mgr, Mich Mines: J B Westwater  
Mgr, Ore Dept: S W Sundsen  
Gen Supt: H C Swanson  
**OHIO-WEBSTER MINE**, Baraga County, surface, Fe  
Supt: K C Olson  
**BUNKER-HILL-MAAS MINE**, Marquette County, undergr, Fe  
Supt: T A Kauppla  
**CAMBRIA-JACKSON**, Marquette County, undergr, Fe  
Supt: R L Tobie  
**CLIFFS SHAFT**, Marquette County, undergr, Fe  
Supt: O Marjana  
**MATHER MINE**, Marquette County, undergr, Fe  
Asst Supt: "A" Shaft: Gil Dawe  
Asst Supt: "B" Shaft: R L Tobie  
undg Supt: "A" & "B" Shafts: A J Andelin  
**TILDER MINE**, Marquette County, surface, Fe  
Supt: K C Olson  
**HUMBOLDT MINE**, Marquette County, surface, Fe  
Supt: K C Olson  
**REPUBLIC MINE**, Marquette County, surface, Fe  
Supt: E W Lindroos  
**RESEARCH LAB**, Marquette County, Ishpeming  
Ch Met: L J Erck  
Proj Eng: D K Campbell  
**PELLITZING PLANT**, Marquette County  
Supt: H W Rembold  
**OKE IMPROVEMENT PLANT**, Marquette County  
Supt: Robert DeGebriele  
**MNG METHODS RESEARCH DEPT**  
Supt: John M Haivela  
*(See Minn, Ohio)*

**COPPER RANGE CO**  
24 Federal St, Boston 10, Mass  
**CHAMPION MINE**, Painesdale, undergr, Cu  
Gen Mgr: Henry Combrellack  
Mine Supt: L Copobianco  
Elec Eng: M Myers  
**PLOT MILL**, Freda  
Supt: John Harris  
*(See Mass, Copper Range Co & White Pine Copper Co)*

**HANNA COAL & ORE CORP**  
Iron River  
Gen Mgr: R W Whitney  
Mgr, Mich Mines: W F Shinnars  
Gen Supt, undergr mines: K R Kuehlthou  
Gen Supt, open pit mines: E W Geist  
Ch Geol: A E Walker  
Dist Geol: P W Zimmer  
Mech Eng: Warren W Jamar  
Elec Eng: Carl W Anderson  
Purch Agt: G E Tromblay  
WAUSEKA MINE, undergr, Fe  
Mine Supt: J D McAuliffe  
Mine Cpt: W A Lundwall  
Prod: 2,000 tons  
**GROVELAND MINE**, Randville, open pit, Fe  
Mine Supt: H Lee  
Gen Foreman: B Sestito  
4,000-TON MILL, Randville  
*(See Minn, Ohio, Ozark Ore Co, Mo)*

**HANNA IRON ORE DIV.**  
**NAT'L STEEL CORP**  
Iron River  
Mgr, Mich Mines: W F Shinnars  
Gen Mgr: R W Whitney  
Gen Supt: K R Kuehlthou  
Ch Geol: A E Walker  
Dist Geol: P W Zimmer  
Mech Eng: Warren W Jamar  
Elec Eng: Carl W Anderson  
Purch Agt: G E Tromblay  
**CANNON MINE**, Stumbaugh, undergr, Fe  
Mine Supt: G A Koehler  
Mine Capt: H Krans  
Prod: 1,900 tons  
**HIAWATHA MINE**, Iron River, undergr, Fe  
Mine Supt: J R Quayle  
Mine Capt: H Thorsberg  
Prod: 2,000 tons  
**HOMER MINE**, Iron River, undergr, Fe  
Mine Supt: J D McAuliffe  
Mine Capt: G Johnson  
Prod: 1,500 tons  
*(See Minn, Ohio, Ozark Ore Co, Mo)*

**INLAND STEEL CO., IRON ORE OPER**

424 S Pine St, Ishpeming  
Pres: Joseph L Block  
Sec: P D Block, Jr  
Sec: Graydon Megan  
Treas: W H Lowe  
**MORRIS & GREENWOOD MINES**, Ishpeming  
**SHEWWOOD MINE**, Iron River  
**BRISTOL MINE**, Crystal Falls, undergr, Fe  
Gen Mgr, Ore Mines: R D Settler  
Mgr, Ore Mines: H M Graff  
Geol: A T Broderick  
Mech Eng: J R Gronseth  
Ch Eng: P R Ribotto  
*(See Ky, Ill, Minn)*

**JACKSON IRON & STEEL CO**  
Iron Mt  
**BRADLEY MINE**, Fe  
Prod: 26,074 tons per year  
(Operated by Edward C Bradley & Sons)

**JONES & LAUGHLIN STEEL CORP, MICHIGAN ORE DIV**  
Negaunee  
**TRACY MINE**, undergr, Fe  
Gen Mgr: R W Braund  
Gen Supt: R L Balconi  
Mech Eng: Michael Kerecman  
Elec Eng: John B Motte  
Mine Supt: R L Prudeux  
Mine Eng: Wm A Benson  
*(See Minn, N Y, Pa)*

**NORTH RANGE MNG CO**

Negaunee  
Pres: F P Book  
Ch of Bd: R S Archibald  
VP: R Archibald  
VP, Oper: F J Haller  
Sec: E S Holmgren  
Treas: Herbert V Book  
Ch Elec: G H Peterson  
Gen Supt: J C Kirkpatrick  
Purch Agt: J M Archibald  
**BOOK MINE**, Alpha  
Supt: J A Nicolson  
Mill Supt: J E Haydon  
Capt: James Pettier  
**CHAMPION MINE**, Champion  
Supt: R L Sundeen  
Capt: Charles Coole  
**WARNER MINE**, Amasa  
Supt: J A Nicolson  
Capt: C A Clements  
**LEONIDAS MINE**, Eveleth  
Supt: Hugh Clark  
Capt: Leonard Erickson  
**PENOKEE**, Ironwood  
Supt: J Zaraw  
Capt: Wm Bianchi

**PACIFIC ISLE MNG CO**  
2521 First Ave, Hibbing, Minn  
**WAKEFIELD MINE**, Wakefield, surface, Fe  
*(See Minn)*

**PICKARDS MATHER & CO, (MANAGING AGENTS)**

Gogebic Dist, Ironwood  
Gen Supt: Carlton D Bailey  
Asst Gen Supt: F R Werther  
Dist Mng Eng: J L Sharer  
Ch Clerk: A W Bulinski  
Dist Safety Supt: George Gerry  
**MAUTHE MNG CO**,  
GENEVA MINE, Ironwood, undergr  
Supt: R L Jose  
**MAUTHE MNG CO**,  
NEWPORT MINE, Ironwood, undergr  
Supt: R L Jose  
Asst Supt: A J Cigalio  
**PURITAN MNG CO**,  
PETERSON MNG CO, Bessemer, under  
Supt: C J Wanguard  
Asst Supt: L G Woodworth  
**SUNDAY LAKE IRON CO**,  
**SUNDAY LAKE MINE**, Wakefield, Undergr  
Supt: R D Dodge  
**MENOMINEE RANGE**, Cospian  
Supt: W E Seppanen  
Dist Mng Eng: Guerdon Anderson  
Ch Clerk: S K Brew  
**VERONA MNG CO**,  
**BUCK MINE**, Cospian, undergr  
**LAWRENCE MINE**, Crystal Falls  
Hill  
**MARGUETTE RANGE** (same super visory personnel as above)  
**PALMER MNG CO**,  
**VOLUNTEER MINE**, Palmer  
*(See Minn, Wis)*

**REPUBLIC STEEL CORP**

Gen Off: Republic Bldg  
Cleveland 1, Ohio  
Dist Off: 204 Bellwood Bldg,  
Euclid 2, Minn

Dist Mgr: F H Cash  
Ch Mng Eng: S C Howell  
Ch Mech & Elec Eng: I V Crago  
**TOBIN-COLUMBIA-MONONGAHELA MINE**, Crystal Falls, undergr, Fe  
Mine Supt: E H Anderson  
Mine Frmr: Emil Johnson  
Assy: J Trevarthen  
Prod: 250,000 tons per year  
*(See Ala, Minn, N Y, Ohio)*

**U S METALS REFINING CO**  
Waterfield  
Explor  
(See N J, American Metal Climax, Inc, N Y)

**WHITE PINE COPPER CO**  
24 Federal St, Boston 10, Mass  
**WHITE PINE MINE**, White Pine, undergr, Cu  
VP & Gen Mgr: William P Nicholls  
VP & Asst Gen Mgr: Geo R McGrath  
Geol: Dr E L Chile  
Met: Virgil L Lessels  
Mech Eng: G F Haberman  
Elec Eng: John A Roller  
Mine Supt: L A Garfield  
15,000-TON PLOT MILL, White Pine  
Mill Supt: Ivan T Bowman  
Asst Mill Supt: Ross E Gamble  
**REVERB SMELTER**, White Pine  
Supt: Geo D Weaver  
*(See Copper Range Co & White Pine Cooper Co, Mass)*

## MINNESOTA

**BUTLER BROS**  
Hibbing  
Mgr of Minn Mines: B M Andreas  
MINES, Cuyuna Range, Minn, Fe, Mn  
**GALBRAITH, GALBRAITH ANNEX MINE**, Nashwauk Twp  
**HARRISON, HALOBE, HOADELY, NORTH HARRISON**, North  
**HARRISON ANNEX, QUINN GROUP MINE**, Nashwauk, Nashwauk Twp, Cooley  
**PATRICK ANN, PATRICK ANNEX, KEVIN, LANGDON, DAVID, SNYDER GROUP MINE**, Cooley, Graeber Twp  
**WYMAN MINE**, Nashwauk Twp  
**MIDWEST GROUP MINE**, Nashwauk, Nashwauk Twp  
**MACKILLICAN MINE**, Nashwauk (See Ohio)

**CHARLESON IRON MNG CO**  
P O Box 335, Power Bldg, Hibbing  
Pres & Sec: C H Remer  
VP & Purch Agt: A T Steele  
Treas: E F Remer

**CHATACO MNG CO**  
(See Pacific Isle Mng Co)

**CLEVELAND-CLIFFS IRON CO, ORE MNG DEPT**  
1460 Union Commerce Bldg, Cleveland 14, Ohio  
Pres: Walter A Sterling  
Asst to Pres: Grover J Holt  
VP, Mng: C W Allen  
Sec: Robert M Kimmel  
Treas: J P Long  
**MINNESOTA OPER**, 2031 E 2nd Ave, Hibbing  
Mgr, Minn Mines: H J Leach  
Gen Supt: W A Pakkala  
**HAWKINS MINES**, Nashwauk, surface  
**WASH PLANT**, H M S PLANT  
Supt: William LeClair  
**HILL-TRUMBLE MINE**, Marble, open pit  
Supt: A E Hill  
**HOLMAN-CLIFFS MINE**, Coleraine, open pit  
Supt: J J Foucault  
**WASH & H M S PLANTS**, Coleraine  
Supt: J J Foucault  
**WANLESS MINE**, Duhl, open pit  
Supt: Mai Viant  
**CANISTEO MINE**, Coleraine, open pit, wash, H M S Plant  
Supt: Ronald Pearson  
*(See Mich, Ohio)*

**CONSUMERS ORE CO**  
Hibbing (M A Hanna Co, Agents)  
Mgr of Minn Mines: B M Andreas  
MINES, Mesabi Range, Fe  
**SARGENT RESERVE**, Calumet  
Hills  
Geo Ohio

**MINING WORLD**

**COONS PACIFIC CO.**  
Box 27, Eveleth  
Pres: H H Harrison  
Supt: D C Kimball  
**CUSTOM IRON ORE CONCESSION**  
8,000 TON GRAV-HEAVY MEDIA  
MILL, Eveleth  
Supt: R G Hurd  
(See Pacific Isle Mng Co)

**DOUGLAS MINING CO**  
Hibbing (M A Hanna Co, Agents)  
Mgr of Minn Mines: B M Andress  
Asst Gen Mgr: R C Wallace  
Ch Eng: R O Buck  
**MINES**, Mesabi Range, Fe  
**DOUGLAS, DUNCAN GROUP MINE**,  
Balkan Two  
**NEVILLE RESERVE**, Stuts Twp.  
Idle  
**SHENANDOAH RESERVE**, Chisholm  
idle  
(See Ohio)

**HALEY-YOUNG MNG CO**  
2223 First Ave, Hibbing  
Pres: E A Young  
Sec-Treas: David D Haley  
**ELBURN MINE**, 2 mi SE of Fraser,  
surface, Fe  
Supt: Leo Casner  
Frm: Michael Molick  
(See Young, E A, Inc, Minn)

**HANNA COAL & ORE CORP**  
Hibbing

Mgr, Minn Mines: B M Andress  
**MINES**, Mesabi Range, Fe  
**ARGONNE LEACH**, CARLZ #2,  
EAST ALPENA, HUNT, PERRY  
MINES, Cuyuna Range, ALSTEAD,  
SO ALSTEAD, ARKO, NO HILLCREST  
& EXTENSION, ARKO, SO HILLCREST,  
HUNTINGTON, FEIGH, MARCO,  
MUSSER, SECTION 6  
MINES, Fillmore & Mower County,  
Q BAKER, H BLY, M BONNERUD,  
G BORNFLETH, O BREHMER, W &  
L BYRD, W COOPER, R COPEMAN,  
J DEPOPE, N FENSTERMACHER,  
W FREEMAN, H GRANUM, K HAFNER,  
F HALL, JR, H V HASLAM, J H  
HEBBO, J HENDRICKSON, B W  
HINGEVELD, G KAPPERS, A KUMM,  
W LEE, H M LONG, C MANDELKO,  
A MATHISON, L MCNEE, W MENSINK,  
G MEYER, O MEYER, K OLSON, T  
OLSON, OSTERD & DUNCAN,  
B PEARCE, J PRINSEN, P RUSEINK,  
G SCHMIDT, G TART, E H THORESON,  
B O THORSON, C WINTER  
(See Mich, Ohio, & Osark Ore Co, Mo)

**HANNA IRON ORE DIV,**  
**NAT'L STEEL CORP**

Box 720, Hibbing  
Mgr of Minn Mines: B M Andress  
**MINES**, Cuyuna Range, Fe, Mn  
CUYUNA, DUNN, POLK, TABERT  
PORTSMOUTH GROUP MINE, Crosby  
**MINES**, Mesabi Range, Fe  
BECKFELDT, FINNEGAR, LUNDRIKAN,  
NATCHEZ, POKEGAMA GROUP RES,  
HUNTER MINE, Coleraine  
(See Mich, Ohio)

**HANNA ORE MINING CO**

Hibbing  
Mgr of Minn Mines: B M Andress  
**MINES**, Mesabi Range, Fe  
BRAY, GORDON, GORDON ANDREY,  
MESABI CHIEF, MISS #3, STEIN  
GROUP MINE, Nashwauk Twp, Kee-  
wee  
**ENTERPRISE MINE**, Virginia  
**PIERCE GROUP**, Hibbing  
(See Ohio)

**HOLLAND MNG CO**  
(See Pacific Isle Mng Co)

**INLAND STEEL CO., IRON  
ORE OPER**  
Iron  
**ARMOUR NO 1 & NO 2 MINES**  
Supt: A T Anderson  
(See Ky, Ill, Mich)

**JESSIE H MNG CO**  
Box 468, Grand Rapids  
Pres: E W Hallett  
VP: R N McGiffert  
**JESSIE MINE**, 3 mi E of Grand Rapids,  
open pits, Fe  
Mine Supt: L R Sewall  
Mine Frm: Art Anderson  
Mine Eng: J J Walker  
Prof: 1,400 tons  
2,000-TON MILL, 3 mi E of Grand  
Rapids

**JONES & LAUGHLIN STEEL  
CORP., MINN ORE DIV**  
Virginia  
Mgr: H P Kullberg  
Asst Mgr: R E Duorcher  
Western Dist Supt: J P Linden  
Eastern Dist Supt: P W Kruse  
Supt of Maint: D Madich  
Ch Acct: T A Parish  
Res Eng: W F Gaspar  
Res Geol: T E Stephenson  
Ch Mng Eng: C H Grant  
Ch Ore Dressing Eng: R W Livingston  
Super, Pers Rel: C E Dickens  
Mine Ind Eng: L E Hodil

**MINES**, Mesabi Range, surface, Fe  
HILL ANNEX MINE, MILL &  
TAILINGS RECLAMATION PLANT,  
Columbus  
Mine Supt: W Ball  
Mill Frm: R L Abercrombie  
Plant Frm: G R Sarff  
LONGYEAR MILL & MINE, Hibbing  
Dist Supt: J F Linden  
Mine Supt: J Strange  
LONG-GREENWAY MINE, Coleraine  
Dist Supt: J F Linden  
Mine Supt: A C Seaberg  
Under level  
**COLUMBIA MINE & MILL**, Virginia  
Dist Supt: P W Kruse  
**SCHLEY-PETTIT MINE & MILL**,  
Gilbert  
Dist Supt: P W Kruse  
(See Mich, M Y, Pa)

**LITHIUM CORP OF AMERICA  
INC**  
Rand Tower Bldg, Minneapolis, Minn  
Pres: Herbert W Rogers  
VP: Fremont F Clarke  
Sec: Salisbury Adams  
Treas: W W Osborne  
Purch Agt: John W Douglas  
Asst: Fred Dixon  
(See NC)

**W S MOORE CO**  
400 Torrey Bldg, Duluth  
Pres: W S Moore  
Sec: H A Nelson  
Geol: J V Everett  
**RANGE OFFICE**, 425 W Grant St,  
Hibbing  
Gen Mgr: H E Reese  
Ch Eng: J M Madson  
Gen Supt: John Johnson  
Mech Supt: N P Arnold  
Gen Plant Frm: W Kinnunen  
Office Mgr: R J Kennedy  
**JUDSON MINE**, 1 mi S of Buhl, surface,  
Fe  
**JUDSON CRUSHING & SCREENING  
PLANT**  
**MARIKSA MINE**, 1 mi NE of Gilbert,  
surface, Fe  
**HEAVY MEDIA CONCENTRATOR**  
ALICE, NORMAN, STUBLER &  
YAWKEY MINES, surface, Fe

**MORTON ORE CO**  
Hibbing  
Mgr of Minn Mines: B M Andress  
**MINES**, Mesabi Range, Fe  
**MORTON, SOUTH EDDY GROUP  
MINE**, Stuts Twp  
Mine Supt: L M Bredvold  
Asst Mine Supt: John E Bemis  
Mine Frm: M A Englund

**OGLEBAY NORTON & CO**  
The Hanna Bldg, Cleveland, Ohio  
NORTHERN OFFICE, 300 Christie  
Bldg, Duluth  
Ind Rel Dir: H J Germannsen  
Mng Eng: A V Torrano  
ST JAMES MINING CO, Aurora  
Mgr: Oglebay Norton & Co  
ST JAMES MINE, Aurora, surface, Fe  
Supt: B L Knudsen  
Asst Supt: T H Tribley  
Master Mech: Walter Williams  
Ch Eng: Edward M Platner  
Elec Eng: (See Ohio)

**PACIFIC ISLE MNG CO**  
2321 First Ave, Hibbing  
Pres: Hugh H Harrison  
VP & Gen Mgr: J D Boenitje, Jr  
Treas: D J Koeler  
Sec: E T Binger  
Gen Supt: Arne O Tuomala  
Asst to Gen Mgr, Eng: H M Hart, Jr  
Asst to Gen Mgr, Met: Donald C  
Kimball  
Mineral Devl Dept: G T Beardshear  
Ch Eng: A T Vellilia  
Mgr, Zentilli Div, Pittsburgh Pacific  
Co: Melo Hill  
**INCLUDES: CHANDLER MNG CO,**  
CHATACO MINING COMPANY,  
COONS PACIFIC COMPANY,  
HOLLAND MINING COMPANY,  
PITTSBURGH PACIFIC CO -

**ZENTILLI DIV**  
**MINES: CHANDLER, CHATACO,**  
CROXTON-SYME, POWLER-MEADOW,  
GRAHAM-WENTWORTH, HOLLAND,  
IROQUOIS, JULIA-COMMODORE,  
LAMBENTON, MANGAN-JOAN-STAI,  
MANUEL MILL, MISSABE MTN,  
MISSISSIPPI #1, ST PAUL, SHADA,  
STEVENSON, UNO-KERR GROUP,  
**VIRGINIA**, WACOOTAH, WEST  
AIRPORT, WESTAR  
**PLANTS: NORTH UNO CONCEN**  
Plant Super: Jack Durham  
**COONS PACIFIC CONCEN**  
Plant Super: Ralph Hurd  
**VIRGINIA CONCEN**  
Plant Super: Earl Saari  
**JULIA WASHING PLANT**  
MANUEL WASHING PLANT  
ST PAUL WASHING PLANT  
(See Mich)

**PHILBIN MNG CO**  
1300 Leader Bldg, Cleveland, Ohio  
**WEGGUM-WOUTH LONGYEAR GROUP**  
Box 720 Hibbing  
Mgr of Minn Mines: B M Andress  
Asst Mgr of Minn Mines: R C Wallace  
Gen Eng: R B Crist  
Mech Eng: J P Vidmar  
Elec Eng: F M Bohan  
Purch Agt: G H Shields  
Mines, surface, Fe  
Mine Supt: L M Bredvold  
WASH PLANT

**PICKANDS MATHER & CO**  
700 Steelwood Bldg, Duluth 2  
Assoc Mng Part: A D Chisholm  
Gen Mgr: E L Joppa  
Mgr of Minn Mines: O L Yauch  
Assoc Gen Mgr: D M Chisholm  
Oper Asst: A L Johnson  
Ch Mech Eng: B W Bestrom  
Purch Agt: D A Brungau  
Suprv of Safety & Ind Rel: E A Arnsdien  
**HIBBING DIST**, Mesabi Range, Hibbing,  
Fe  
Gen Supt: T C Thielman  
Asst Gen Supt: R T Bell  
Dist Mng Eng: R W Sullivan  
Ch Clerk: W S Home  
Dist Safety Suprv: C E Hager  
**CRETE MINING CO**, ALBANY MINE  
& WASHING PLANT, Hibbing, undergr  
Supt: R T Tregembo  
**HOYT MINING CO**, SCRANTON MINE  
CRUSHING & WASHING PLANT,  
Hibbing, surface  
Supt: E C Sponberg  
**MAHONING ORE & STEEL CO**,  
MAHONING MINE, Hibbing, surface  
Supt: W D Webb  
**UTICA MNG CO**, CARMICARSON  
LAKE MINE & CRUSHING PLANT,  
Hibbing, surface  
Supt: J E Schelske  
**BALKAN MNG CO**, DANUBE MINE  
& BENEFICATION PLANT, Bovey,  
surface  
Supt: W L Thome  
**WESTERN MINING CO**, WEST HILL  
MINE & BENEFICATION PLANT,  
Grand Rapids, surface  
Asst Supt: L T Lang  
**CUYUNA DIST**, Cuyuna Range, Crosby  
Gen Supt: J P Schremmel  
Dist Mng Eng: D W Carlton  
Ch Clerk: Matt Kayes  
**CUYUNA ORE CO**, MAHOMEN  
MINE & CRUSHING PLANT, Crosby,  
surface  
Supt: H Stetson  
**SAGAMORE ORE MNG CO**,  
SAGAMORE MINE, CRUSHING &  
DRYING PLANT, Riverton, surface  
Supt: H Stetson  
**YOUNGSTOWN MINES CORP**  
HAMMETT LAKE MINE & CRUSHING  
PLANT, Crosby, surface  
Supt: H Stetson  
(See Mich, Wis)

**PIONEER MNG CO**  
Box 200, Bismarck  
Pres: Frank S Bergstrom  
Ch of Bd: Patrick Butler  
Sec: F J McArthur  
Treas: R J Floder  
Sec: E T Binger  
Gen Supt: Arne O Tuomala  
Eng: H M Hart, Jr  
Met: Donald C  
Kimball  
Mineral Devl Dept: G T Beardshear  
Ch Eng: A T Vellilia  
Mgr, Zentilli Div, Pittsburgh Pacific  
Co: Melo Hill  
**INCLUDES: CHANDLER MNG CO**,

**PITTSBURGH PACIFIC CO**  
(See Pacific Isle Mng Co)

**REPUBLIC STEEL CORP**  
Gen Off: Republic Bldg, Cleveland  
L, Ohio  
Dist Off: 204 Seawood Bldg, Duluth

Dist Mgr: F H Cash  
Ch Mng Eng: S C Howell  
Ch Mech & Elec Eng: I V Crege  
**SUSQUEHANNA MINE**, Hibbing,  
open pit  
Supt: M C Woodie  
Eng: S V Smith, Jr  
(See Ala, Mich, N Y, Ohio)

**RESERVE MNG CO**  
Silver Bay  
Pres: W M Kelley  
VP: C L Kingsbury  
VP & Treas: J W Bryant  
Sec: J J Dwyer  
Mgr of Oper: E C Lampman  
Purch Agt: E K Woods  
Dir Pub Rel: Edward Schmidt  
Dir Ind Rel: W L Edwards  
Pelletizing Supt: K M Haley  
Crushing & Concen Supt: E M Furness  
**PETER MITCHELL TACONITE MINE**,  
Babbitt, open pit, taconite  
Mgr, Babbitt Div: Floyd W Erickson  
Mine Supt: F E McIntire  
**SILVER BAY PLANT**, E W Davis  
Works, Silver Bay, magnetic separa-  
tion  
(See Ohio)

**RHODE & FRYBERGER**  
Box 770, Hibbing  
Part: J O Rhude, R M Fryberger  
**TROY MINE**, Eveleth, Mesabi Range,  
open pit, Fe, H M S & JG PLANT  
**BOEING MINE**, Hibbing, Mesabi  
Range, open pit, Fe, Wash Pl  
**PENNINGTON MINE**, Ironon, Cuyuna  
Range, undergr, Fe  
**CARLSON-NELSON MINE**, Cuyuna  
Range, open pit, Fe  
**HMS & JG PLANT**

**ST JAMES MNG CO**  
(See Oglebay Norton Co)

**SKUBIC BROS CO**  
105 6th Ave N, Virginia  
Pres & Treat: Frank Skubic  
VP & Purch Agt: Edward Skubic  
**VIRGINIA MINE**, Eveleth, 3 mi S  
Virginia, surface, Fe  
Gen Supt: Edward Skubic  
Mine Frm: Luther Swanson  
Elec Eng: Karl Sulentic  
Idle  
Mill Frm: Joseph Spolar

**SNYDER MNG CO**  
1101 Alworth Bldg, Duluth 2  
Pres: Wm P Snyder, Jr  
VP & Gen Mgr: A L Fairley, Jr  
Gen Supt: C O Rudstrom  
Ch Eng: A C Borgeson  
Ch Chem: A W Johnson  
Mech Supt: A A Erickson  
Comptroller: V O Youngdahl  
Purch Agt: C J Hathaway  
Suprv, Mobile Eng: O E Larsen  
Gen Maint Frm: J Zobitz  
**WEBB MINE**, Hibbing, open pit, Fe  
Mine Supt: J J Mancey  
Gen Mine Frm: A E DesRosier  
Asst Gen Mine Frm: J J Munter  
Res Eng: E Zobitz  
4,000-TON GRAV MILL  
Mill Frm: A E Erickson  
**WHITESIDE MINE**, Buhl, open pit, Fe  
Mine Supt: R M Baker  
Asst Mine Supt: T J Barker  
Gen Mine Frm: A Stukel  
Res Eng: D C Swalm  
Master Mech: F C Hodge  
20,000-TON GRAV-MILL, at  
Whiteside mine  
**GODFREY MINE**, Chisholm, undergr,  
Fe  
Mine Supt: H P Haller  
Mine Capt: O A Aselson  
Mine Eng: K P Coen  
Master Mech: J V Vidmar  
(See Pa)

**SOUTH AGNEW MNG CO**  
Hibbing  
Mgr of Minn Mines: B M Andress  
**MINES**, Mesabi Range, Fe  
**SOUTH AGNEW, AGNEW NO 3**  
GROUP MINE, Stuts Twp  
Mine Supt: L M Bredvold  
Asst Mine Supt: John E Bemis  
(See Ohio)

**U S STEEL CORP., OLIVER  
IRON MNG DIV**  
Wolvin Bldg, Duluth 2  
Pres: R T Elstad  
VP-Oper: W N Matheson  
Asst to VP-Oper: L S Campbell,  
W E Cotter, Jr  
VP-Administrative: R O Hawkeson  
Asst Sec: E P Clarke  
Treas: R B Devere  
Comptroller: W F Hitler

## Minnesota — Montana

Mgr: Mng Eng: N A Moberg  
 Mgr Geol: Investigation: R W Marsden  
 Mgr Beneficiation: A T Koenen  
 Mgr Research: R J Morton  
 Mgr, Indust Eng: Q T Martin  
 Superv Ore Movement: F J Ferry  
 Ch Eng: C N Bailey  
 Dir, Ind Rel: J B Bone  
 Purch Agt: L L Stabonik  
 Ch Grader: G H Sharback  
**EASTERN DISTRICT, Virginia**  
 Gen Supt: John Chisholm  
 Ass't Gen Supt: M V Melke  
 Supt of Maint: J A Vitthaus  
 Ass't Supt of Maint: C A Lindberg,  
     C R Peterson,  
     W A Hyde  
 Ch Mng Eng: J T Nolan  
 Ch Chem: I R Lerohi  
**STEVENS MINE**, Mesabi Range,  
 surface, Fe  
 Supt: D Hartley  
 Ass't Supt: E J E Olson  
**EVELETH MINE**, Mesabi Range,  
 surface, Fe  
 Supt: F D Hoover  
 Ass't Supt: T C Oliver  
**PILOTAC MINE**, Mesabi Range,  
 surface, Fe  
 Supt: L H Robow  
**ROUCHEAU MINE**, Mesabi Range,  
 surface, Fe  
 Supt: E V Nelson  
 Ass't Supt: D B Muckler  
**PIONEER MINE**, Vermillion Range,  
 undergr., Fe  
 Supt: L E Dick  
 Ass't Supt: J D Warner  
**SOUUDAN MINE**, Vermillion Range,  
 undergr., Fe  
 Supt: E M Holmes  
**EXTACA PLANT**, Mesabi Range,  
 agglomerating  
 Ass't Supt: C W Niemi  
**HIBBING-CHISHOLM DISTRICT**,  
 Hibbing  
 Gen Supt: J H Hearding, Jr.  
 Ass't Gen Supt: H G Holland  
 Supt of Maint: J R Schoenig  
 Ass't Supt of Maint: K L Prothero  
 Ch Mng Eng: R Sorenson  
 Ch Chemist: W E Holliday  
**HILL RUST MINE & CONCENTRATOR**,  
 Mesabi Range, surface, Fe  
 Supt: E C Silver  
 Ass't Supt: W J McGuire  
**SHERMAN MINE GROUP**, Mesabi  
 Range, surface, Fe  
 Supt: M J Forsmark  
 Ass't Supt: M D VanDellinder  
**PILLSBURY MINE**, Mesabi Range,  
 surface, Fe  
**MONROE MINE**, Mesabi Range,  
 surface, Fe  
 Supt: W W Bebe  
 Ass't Supt: E M Gilmore  
**FRASER MINE**, Mesabi Range,  
 undergr., Fe  
**CANISTEO DISTRICT**, Coleraine  
 Gen Supt: E A Friedman  
 Ass't Supt: M E Johnson  
 Supt of Maint: A C Prisk  
 Ass't Supt of Maint: R N McIndoo  
 Ch Mng Eng: L E Battles  
 Ch Chem: M O Carlson  
**ARCTURUS MINE**, Mesabi Range,  
 surface, Fe  
 Supt: H F Bolton  
**KING MINE**, Mesabi Range, surface,  
 Fe  
 Supt: J H Harrison  
 Ass't Supt: L Scipioni  
**PLUMMER MINE**, Mesabi Range,  
 surface, Fe  
 Supt: A P Savage  
 Ass't Supt: F J Hitchcock  
**TROUT LAKE CONCENTRATOR**,  
 Mesabi Range  
 Ass't Supt: V V Ahola  
**PLUMMER CONCENTRATOR**,  
 Mesabi Range  
**ARCTURUS CONCENTRATOR**  
 Ass't Supt: T O Olsen  
 (See Alaska, Ala, Calif, Pa, Tenn,  
 Utah, Wyo)

**YOUNG, E A INC**  
 2223 First Ave, Hibbing  
 Pres: E A Young  
 VP & Supt: Neil Kempaninen  
 Sec: D D Haley  
**MINNEWAIS MINE**, P O Box 116,  
 Virginia, 2 mi E of Virginia, Mesabi  
 Range, surface & undergr., Fe  
 Frmr: A N Heiskila  
 (See Haley-Young Mng Co, Minn)

**ZONTELLI BROS. INC**  
 Ironon  
 Pres: Emil Zontelli  
 VP: Henry Zontelli  
 Sec-Treas: Anne V Stang  
 Gen Mgr: W E Hill

Gen Supt: Henry Zontelli  
 Met: John Simons  
 Geol: Elton LaSari  
 Mech Eng: Francis Chase  
 Elec Eng: Dan Doohan  
 Purch Agt: Ernest Kuzner  
**VIRGINIA MINE**, N of Ironon,  
 Cuyuna Range, surface, Fe  
 4,000-TON VIRGINIA PLANT  
**THOMMELD**  
**MONTANA MINES**  
**GRAHAM NO 1 MINE**, Mesabi Twp.  
 Mesabi Range, surface, Fe  
**MANGAN-JOAN MINE**, Irondequoit,  
 Cuyuna Range, surface, Fe  
**MERRITT LEAN ORE STOCKPILE**,  
 Trommeland, Cuyuna Range  
**MANUEL MINE**, Crosby, Cuyuna  
 Range, surface, Fe  
 2,900-TON MANUEL PLANT, Crosby  
 (See Wisal)

## MISSISSIPPI

**AMERICAN COLLOID CO**  
 Merchandise Mart Plaza  
 Chicago, Ill  
**ABERDEEN MINE**, surface, bentonite,  
 Aberdeen  
 Supt: Edward G Birkholz  
**ABERDEEN MILL**  
 Cap: 250 tons  
**WHITE SPRINGS MINE**, surface,  
 bentonite, White Springs (P O at  
 Aberdeen)  
 Supt: Edward G Birkholz  
 (See Ill, S Dak, Wyo)

**INTERNATIONAL MINERALS &**  
**CHEMICAL CORP**  
 Smithville (P O Amory)  
 Mgr: C M Clay  
 Supt: J Flowers  
**SOUTHERN BENTONITE MINE**,  
 open pit  
 (See Ariz, Colo, Fla, Ill, Me, N Mex,  
 N C, Ohio, Tenn, Va, Wyo)

**MISSOURI**

**AMERICAN ZINC, LEAD &**  
**SMETLING CO**  
 1515 Paul Brown Bldg, St Louis  
 Pres: H J Young  
 VP: Thornton Emmone, Alwin C  
 Eide, Richard A Young,  
 Howard L Young  
 VP & Treas: W J Matthews, Jr  
 VP & Cont: C V Burns  
 VP, Chg Traffic: Nel S Worrell  
 Sec & Ch Counsel: R C Perkins  
 Ass't Sec & Ass't Treas: R K Wall,  
 L S Jones  
 (See Ariz, Ill, Miss, Ohio, Okla,  
 Tenn, Tex, Wash, Wisc)

**APEX MNG CO**  
 Poisai  
 MINE, Washington County, barite

**BARYTES MNG CO**  
 Poisai  
 MINE, Washington County, barite

**BIG FOUR MNG CO**  
 Miami, Okla  
 MINE, Newton County, Zn

**BRUFORD MNG CO**  
 DeSoto  
 MINE, Jefferson County, barite

**DE SOTO MINING CO**  
 226 S Main St, DeSoto  
 MINE, surface, barite

**FEDERAL MNG & SMETLING CG**  
 (Wholly-owned subord of Amer  
 Smelting & Refining Co)  
**DUTENWEG MINE**, Jasper, Pb, Zn  
 Idia

**GENERAL BARITE CO**  
 DeSoto  
 Pres: J Marshall Thompson  
 VP: C M Faulkner  
 MINE, Blackwell, barite

**H & F MNG CO**  
 Poisai  
 MINE, Washington County, barite

**HOLLY, E A, MNG CO**  
 Riverside, Texas  
 MINE, Washington County, barite

**HORNSEY BROS**  
 P O Box 398, Poisai  
**MINE**, 1 mi S of Poisai, Wash  
 County, open pit, barite  
 Mine Frmr: H R Hale, Ronie Blair  
 100-TON GRAV MILL

**KOSHKONONG MNG CO**  
 Koshkonong  
 MINE, Howell County, Fe

**MAGNET COVE BARIUM CORP**  
 Poisai  
**MINE**, Poisai, open pit, barium  
 Plant Mgr: George L Carter  
 Ass't Plant Mgr: Floyd H Carter  
 Ass't to Plant Mgr: R J Mense  
**WASHING PLANT**, at mine  
 Supt: B J DeClue  
 250-TON MILL, at mine  
 Supt: Russell Degonia  
 (See Fla, Nev, Tex, Wyo)

**MIDWEST MNG CO**  
 Box 87, Poisai  
**MINE**, Washington County, barite

**MINE LA MOTTE CORP**  
 350 Park Ave, N Y 17, N Y  
 Pres: Andrew Fletcher  
 VP: C M Chapin, Jr, Jos A Martinez  
 VP & Treas: George I Bridgen  
 Sec: Donald K Lourie  
**MINE LA MOTTE**, undergr, surface,  
 Ph, Bonne Terre  
 Div Mgr: E A Jones  
 Div Supr: P F Redfield  
 3,000-TON PLOT-GRAV MILL,  
 Fredericktown

**MINERAL POINT MNG CO**  
 West Plains  
**MINE**, Howell County, Fe

**MINERVA OIL CO,**  
**FLUOR DIV**  
 320 N 4th St, St Louis  
 Pres: Joe Desloge  
 VP: Joe Desloge, Jr  
 Sec: Berkley Jones  
 Gen Mgr: Gill Montgomery  
 (See Ill)

**MONSANTO CHEM CO**  
 Lindenbergh & Olive St Rd,  
 St Louis 4  
 Pres: Charles Alan Thomas  
 Dir of Mng: G Donald Emigh  
**INORGANIC DIV**  
 Gen Mgr: J L Christian  
 Dir Eng: W T Durrett  
**MINES & PLANT**, Monsanto, Tenn,  
 elemental phosphorus  
 Plant Mgr: Edward J Bock  
 (See Idaho, Tenn)

**NATIONAL LEAD CO,**  
**BAROID DIVISION**  
 Fountaintown, Poisai, surface,  
 barite  
**WET GRIND MILL**  
 Supt: E L H Sackett  
 (See Ark, Calif, Kan, La, Mont, Nev,  
 NY, Tenn, Tex, Wyo)

**NATIONAL LEAD CO, ST**  
**LOUIS SMELTING & REFINING DIV**  
 Box 351, Fredericktown  
 Gen Mgr: O D Niedermeyer  
 Mgr: Harold A Krueger  
**MADISON MINE**, Fredericktown,  
 undergr., Pb, Cu, Ni, Co  
 Gen Supt: J P Phoebe  
 Mine Supt: F H Hurst  
 Geol: R P Uhley  
 Met: Corbin Marsh  
 Elec Eng: R W Slavens  
 1,500-TON PLOT MILL  
 Mill Supt: G F Coops  
**REFINERY**, Fredericktown  
 Mgr: W R McCormick  
 Supt: G E Peters  
 Under devel  
 (See Ark, Calif, Kan, La, Mont,  
 NY, Tenn, Tex, Wyo)

**OZARK ORE CO**  
 Iron Mountain  
**IRON MOUNTAIN MINE**, undergr,  
 iron ore  
 Gen Supt: R P Matson  
 Geol: John Murphy  
 Mine Frmr: Byron Miller  
 Mine Eng: R Pilliard  
 Master Mech: Henry Gratton  
 Chief Elec: Vic Callisto  
 3,000-TON GRAV MILL  
 Mill Supt: Lloyd Erpembach  
 Mill Frmr: Leo Williams, Luther  
 Williams  
 Ass't: R B Key  
 (See M A Hanna Co & Oscar Ore, Ohio)

## PATRILLO MNG CO

Caufield

MINE, Howell County, Fe

## POTTER SIMS MINES INC

Box 298, Joplin

Pres: Geo W Potter

VP & Gen Mgr: D S Sims

Gen Supt: Leonard Parker

Mine Supt: Jack Bolding

Ass't Mine Supt: John Skinner

Mine Frmr: Geo T Brown

SUCKER FLAT MINE, Webb City

WESTSIDE MINE, 1/2 mi S of Alba

open pit, Pb, Zn

2,500-TON PLOT-GRAV MILL, Webb

City

Mill Supt: Floyd C Cain

Idia

## ST JOSEPH LEAD CO

250 Park Ave, N Y 17, N Y

Pres: Andrew Fletcher

VP: C M Chapin, Jr, Francis

Cameron, R J Mechlin

VP-Treas: George I Brigden

VP & Sales Mgr: Charles R Ince

SOUTHEAST MISSOURI MNG & MLG

DIV, Box 33, Bonne Terre, undergr.

Pt, Zn

Div Mgr: Elmer A Jones

Ch Geol: John S Brown

Gen Mech Supt: B L Beal

Div Supt, Indian Cr Mine & Mill:

K R Baker

Gen Mine Supt: L L Taylor

Ass't Gen Mine Supt: C B Davis,

B T Wykoff

## S-PLOT-GRAV MILLS

Gen Mill Supt: T J Clifford

Mill Supt: H A Hoffman, H R Stahl,

M N Dunlap, K B Hall

Ass't Mill Supt: E J Kroksoski

Cap: 24,000 tons

BLAST FURNACE, Herculaneum

Div Mgr: W T Isbell

Cap: 100,000 tons lead yrly

(See N Y, Pa)

## SHOOK & FLETCHER SUPPLY CO

West Plains

KINGSBURY MINE, Howell County,

open pit, Fe

Gen Mgr: E H Craddock

Mine Supt: Robert Wilson

(See Ariz)

## STEPHENS MNG CO

2nd & Jefferson St, West Plains

Part: Carroll J Stephens, W H

Stephens

MINE, 6 mi W of West Plains, open

pit, Fe

Prod: 50 tons

WASHER, at mine

## TERRACE MINING CO

Poisi

Pres & Gen Mgr: Dall B Groves

VP: Julia E Floyd

Sec: Robert D Evans

TERRACE MINE, 7 mi N Poisi,

surface, barite

Mine Frmr: Harry D Patterson

Prod: 50 tons

75-TON GRAV MILL

Mill Frmr: Harry D Patterson

## UTLEY, A T

P O Box 398, Cape Girardeau

NEWER MINE, Oregon County, open

pit, Fe

Mine Supt: A T Utley

Mine Frmr: Cecil Weldon

Prod: 150 tons

## MONTANA

## AMAZON MNG CO

Box 372, Coeur d'Alene, Idaho

Pres: A E Lundin

Sec-Treas: Geo M Servick

MINE, near Heron, Au, Ag, Cu

Mont Agt: Joe Brooks, Noxon

Under devel

(See Idaho)

## AMERICAN CHROME CO

1 Montgomery St, San Francisco 4

California

Pres: Willis A Swan

VP & Gen Mgr: John Bley

Sec: Geo M Squarling

Treas: John L Lyons

Purch Agt: D W Graves

MOUAT-SAMPSON MINE, Nye,

undergr., chrome conc.

## MINING WORLD

Geol: E S Rugg  
Prod: 1,000 tons  
1,000-TON FLOT MILL, Nye

**AMERICAN MACHINE & METALS, INC., TROUT MNG DIV**

223 Broadway, New York 7, NY  
Pres: C W Anderson  
Sec: Alphonse Kenison  
Treas: Robert G Burns  
**TROUT-ALOONQUIN GROUP,**  
Philipsburg, 2 mi E of Philipsburg,  
undergr., Ag, Zn, Pb, Mo<sub>2</sub>  
Gen Mgr: Roy McLeod  
Ass't Gen Mgr: Roy Hamilton  
Geol: Frederick Dowsky  
Mine Supt: Thomas Purle  
Prod: 175 tons  
175-TON GRAV MILL  
Mill Supt: Thomas Purle  
Mill Eng: Kenneth Bauer  
(See NY)

**AMERICAN SMELTING & REFINING CO**

JACK WAITE MINE, Sanders County,  
Pb, Zn (See Idaho)  
Supt: C H Blackwell  
**EAST HELENA PLANT,** East Helena,  
Custom Lead Smelter  
Mgr: Joseph T Roy  
Supt: S M Lane  
(See Aris, Calif., Colo, Idaho, Ill,  
Kans, Md, Nebr, NJ, N Mex, NY,  
Tex, Utah, Wash & Federal Mng &  
Smelting Co, Mo)

**ANACONDA ALUMINUM CO**

Columbia Falls  
Pres: R D Caples  
VP: C H Steele  
Sec-Treas: C E Moran  
Purch Agt: A B Harris  
Gen Supt: J F Smith  
**REDUC PLANT,** Columbia Falls, Al  
Mgr: H G Satterthwaite  
Scheduled prod: 120,000,000 lbs  
(See MT)

**ANACONDA CO., THE**

Buile  
VP, Chg West Oper: C H Steele  
Gen West Counsel: J T Finlen  
Gen Mgr, West Mng Oper: A C Bigley  
Asst to VP: H D Hickney, Jr  
Asst Sec-Treas: D E Nelson  
Mgr of Mines: I H Renouard, Jr  
Gen Supt of Mines: A R Sims  
Asst Ch Gool, No America: M H Gidel  
Ch Geol Dept, Buile, E P Shes  
Ch Min Eng: Fred Straderberg  
Ch Sampler: P K Ramster  
Ch Eng Research Eng: L F Bishop  
Ch Mech & Elec Eng: C J Lundborg  
Mech Supt: George Lilly  
Asst Mech Supt: Paul Young, Frank Ralph

Elect Supt: Merton Callow  
Chmn, Bureau of Safety: H A Wendel  
Chvn Ventil Eng: J W Warren  
West Purch Agt: F W Switzer  
Labor Commissioner: Eugene Hogan  
Dist Traffic Mgr: W L Kennedy  
Ch Assayer: W C Gallagher, Jr  
Supt, Washoe Sampler: Dennis E Leary  
Frmn, Precip Pl: J P Ryan  
Block Cave Eng: R C Corbett  
Ch Draftsman: Marcus McCanns  
Dir, Min Research: E R Borcherdt  
Asst Gen Supt, Kelley Mine: Martin Hannifan

Asst Gen Supt, Mt Con, Steward,  
Supt, Reverser: E O O'Leary  
Supt, Dust Treat: J J Dougherty  
Asst Gen Supt, Kelley Mine: Martin Hannifan

Asst Gen Supt, Mt Con, Steward,  
Emma & Original Mines: W R C Russert

Asst Gen Supt, Berkeley Pit, Badger,  
Lexington Alice Mines & High Ore Pumping Pl: E O Bonner

Asst Gen Supt, Orphan Girl, Belmont & Leonard Mines: V D O'Leary  
ALICE MINE, Butte dist, undergr., Zn

Asst Gen Supt: Ed Bonner

Idie  
**ANSELMO MINE,** Butte dist, undergr., Zn

Asst Gen Supt: V D O'Leary

Mine Supt: Sam Heatherly

**BADGER MINE,** Butte dist, undergr., Zn

Asst Gen Supt: Ed Bonner

Frm: Steve Hurley

**BELMONT MINE,** Butte dist, undergr., Cu

Asst Gen Supt: V D O'Leary

Frm: John Kolesar

**BERKELEY OPEN PIT COPPER MINE,** Butte dist, open pit, Cu

Ass't Gen Supt: E O Bonner  
Supt: G W Parker  
Frm: E E Norris  
Min Eng: J J Dougherty  
EMMA MINE, Butte dist, undergr., Mn  
Ass't Gen Supt: W R C Russert  
Frm: William Kershish  
**HIGH ORE PUMPING PLANT,** Butte dist  
Ass't Gen Supt: Ed Bonner  
Frm: Joe Canavan  
**KELLEY MINE, GREATER BUTTE PROJECT,** Butte dist, open pit, Cu  
Ass't Gen Supt: Martin Hannifan  
Ass't Gen Supt, Filling oper: Hale Stock  
Mine Supt: John Kelly  
**LEONARD MINE,** Butte dist, undergr., Cu  
Ass't Gen Supt: Hale St rock  
Mine Supt: Russell Powell  
**LEXINGTON MINE,** Butte dist, undergr., Zn  
Ass't Gen Supt: Ed Bonner  
Mine Supt: Dan Griffin  
Idie  
**MT CON MINE,** Butte dist, undergr., Cu  
Ass't Gen Supt: W R C Russert  
Mine Supt: John Suttle  
Idie  
**ORIGINAL MINE,** Butte dist, undergr., Cu  
Ass't Gen Supt: W R C Russert  
Idie  
**ORPHAN GIRL MINE,** Butte dist, undergr., Zn  
Ass't Gen Supt: V D O'Leary  
Frm: Herman Gillis  
Idie  
**STEWARD MINE,** Butte dist, undergr., Cu  
Ass't Gen Supt: W R C Russert  
Idie  
**TRAVONA MINE,** Butte dist, undergr., Zn  
Idie  
**ANACONDA REDUCTION WORKS**  
Anaconda  
Mgr: W A Emanuel  
Gen Supt: F H Day  
Ass't Gen Supt: J R Moore  
Project & Devel Eng: C M Holstrom  
Supr. Employee Relations: C F Millikin  
Supr. Concentration: F A Roder  
Supr. Smelting: E S Kramick  
Supr. Converting & Casting: J T O'Donnell  
Supr. Electrolytic Zinc Pl: F A Balmonson  
Supr. Roasters: A C Bigley, Jr  
Supr. Electrolyzing & Casting: K O Swanson  
Supr. Acid & Phosphate Pl: K F Huchard  
Supr. Manganese Nodulizing Pl: E O Strommen  
Research Eng & Dir of Met Research: F L Holderreed  
Ass't Research Eng: R E Sullivan  
Testing Eng: T G Fulmor  
Met: J H McCrea  
Chm: E M Boyce  
Chm Chemist: E M Boyce  
Mech Supr: L E Larsen  
Supr. Construction: M A Stokke  
Ch Draftsman: E P Dimock  
Hygiene & Vac Eng: H F Morris  
Safety Eng: F X Neidham  
Supr. Emp: F X Bach  
Supr. Fire & Watch Dept: J J Dillon  
Supr. Smg & Tailings: J A Grant  
Supr. Surface: J G Gross  
Supr. Repair Foundry: H M Hansen  
COPPER CONCEN, 38,000 tons per day  
ZINC CONCEN, 4,000 tons per day  
MANGANESE CONCEN, 1,500 tons per day  
COPPER SMELTER, 150,000 tons per year  
**ELECTROLYTIC ZINC PLANT,** 86,400 tons per year  
**SULPHURIC ACID PLANT,** 600 tons 60% Bume acid per day  
**TREBLE SUPERPHOSPHATE PLANT,** 100,000 tons per year  
**MANGANESE NODULIZING PLANT,** 415 S D T per day  
**FERROMANGANESE PLANT,** 3,200 S D T per month  
**ARSENIC PLANT,** 1,000 tons white arsenic per month  
**GREAT FALLS REDUCTION WORKS**  
Great Falls  
Mgr: F S Welmer  
Gen Supt: E D Tierney  
Ass't Gen Supt: J L Ingvalson  
Mech Supt: J W Porter  
Met: R J Lapes  
Ch Clerk: W P Sneddon  
**EAST HELENA SLAG PLANT**  
Supt: R L Thompson

Ass't Sept: A B Kane  
**ELECTROLYTIC & FURNACE COPPER REFINERIES,** 144,000 & 130,000 tons per year  
Sept: S R Westgaard  
Ass't Supt: G Cadwell  
Consultant: R H Miller  
**ELECTROLYTIC ZINC REFINERY,** 162,000 tons per year  
Supr. Eng: Worcester  
Ass't Supt: R H Bahnsen  
**EAST HELENA SLAG TREATING PL**  
Supt: R L Thompson  
Ass't Supt: A B Kane  
(See Cald, Idaho, Nev, N Mex, N.Y.  
Utah)

**ANTONIOLI, PETER & PETER JR**

524 S Washington St, Butte  
**BURLINGTON MINE,** Silver Bow, Mn  
Idie

**PHOSPHATE MINE,** Highland dist, phosphate rock  
Under devel

**TZARINA MINE,** Butte dist, Mn, Za  
**WHITEHALL MINE,** Whitehall Dist, ~ Jefferson County, Au, Ag, Pb, Zn

Idie  
**SCRATCH ALL & CONTACT MINE,** Flint Creek dist, Mn, Au, Ag, Cu, Pb, Zn

**BASIN-JIB MINES LTD**  
100 Adelaide St, Toronto 1, Ontario

Pres: Dennis Denney  
VP: J G Pierdon  
Sec: Margaret B Smith  
**BASIN JIB MINES,** Basin, Box 406, Boulder, undergr., Au, Ag, Pb

Idie  
**BLACK & WHITE MNG CO**  
331 N Ave W, Missoula

Pres & Gen Mgr: Roger F Little  
**BROOKLYN MINE,** Maxville, 4 mi N of Philipsburg, undergr & surface, Ag, Pb, Zn

Under devel  
(Lessed to Treasure State Uranium Co, Helzien)

**BUTTE COPPER & ZINC CO**  
25 Broad St, New York 4, N.Y.

Pres: A Shekare  
VP & Treas: Miles MacDonald

Sec: John F Cole  
**EMMA MINE,** 203 Lewiston Bldg, Butte, undergr., Mn, Ag, Pb, Au

Res Eng: Samuel Barker, Jr  
Prod: 1,100 tons  
(Operated by Anaconda Copper Mng Co)  
(See NY)

**CAPITAL-SEABOARD CORP**  
(Formerly Capitol Uranium Co)  
Box 1947, Farmington, N Mex

Pres: Joseph H Corbin

Exec VP: Charles W Yetter

Sec: William A Pope, Jr

Treas: Howard L Corbin

**BOULDER IRON MINE,** Park & Sweetgrass Counties, open pit, Fe

Gen Mgr: Charles W Yetter  
Ass't Gen Mgr: Ray A Bennett  
Under devel  
(See Aris, Idaho, N Mex, Tex, Utah)

**CHARTER OAK MNG CO**  
Box 548, Elliston

**CHARTER OAK MINE,** Elliston, 5 mi S of Elliston, undergr., Pb, Ag, Au, Zn

Gen Mgr: J T Bonner  
Under devel  
**80-TON FLOT MILL,** at mine

Under devel  
**COLOTAU URANIUM CORP**  
105 Midland Bank Bldg, Billings

Mgr: S P Kurth  
**SNAIL CLAIMS,** U<sub>3</sub>O<sub>8</sub>

**CONTACT MINING CO**  
524 Washington St, Butte

Pres: Peter Antonioli, Sr  
Gen Mgr: Peter Antonioli, Jr

Met: Frank M Antonioli

**SCRATCH ALL MINE,** Philipsburg, undergr., Ag, Zn, Mn, Pb

**HIGHLAND PHOSPHATE MINE,** Butte, 15 mi S of Butte, undergr & surface, phosphate

Under devel  
**CRUMB, RAY W**  
Avon

**HUMDINGER MINE,** 21 mi N of Avon, undergr., Au, Ag

Under devel  
**4-TON GRAV MILL**

Under devel  
**LITTLE ROCKIES MNG & DEVEL CO**  
Landusky

Pres: Frank B Bryant

VP: Edward F Wigleland

Sec & Treas: Cecil Flinders

Purch Agt: Marion Heller

**LITTLE BEN MINE,** Landusky

**CUMMINGS-ROBERTS**

739 N Highland Ave, Los Angeles 38, California

Gen Part: H Evans Roberts

**CRYSTAL MT MINE,** 26 mi E of Derby, open pit, Ca<sub>2</sub>

Gen Mgr: John W Taber

Geol: Melvin Faber

Mine Supt: Gordon Blackburn

Prod: 600 tons

**SHINGING MILL**

Chem: William Bickel

**DOMESTIC MANGANESE & DEVEL CO**

Box 117, Butte

Press & Purch Agt: J H Cole

VP: S A Pumpey

Sec-Treas: Kathryn C Keith

400-TON FLOT MILL with nodulizing oxide & carbonate ore

**ELKHORN MNG CO**

Boulder Bank Bldg, Boulder

Pres, Gen Mgr & Purch Agt:

Wade V Lewis

VP: Hugh S Cannon

Sec-Treas: J T Lewis

**ELKHORN & FREE ENTERPRISE MINES,** Elkhorn & Boulder, undergr

Geol & Min Eng: Wade V Lewis

Under devel

**WILSON-ELKHORN MINE,** 2 mi S of Clancy, undergr

Idie

**FAITH MNG CO**

Monarch

Pres & Treas: C M Wall

VP & Gen Mgr: T J Vaughn-Rhys

Sec: Blanche Mares

**LIBERTY MINE,** Barker mng dist, undergr., Ag, Au, Pb, Zn

Under devel

**FORMINCO INC**

c/o Harry Anders, Townsend

**MARIETTA MINES,** 17 Mi NW of Townsend in Part dist, Au, Ag, Pb, Zn

Under devel

**GARRETT MNG & MLG CO**

P O Box 334, Anaconda

Own: Eugene Garrett

**DELTA MINE,** Red Lion Mng dist, undergr., Au

**FLOT MILL,** North Fork Flint Creek

Under devel

**HALF MOON MNG CO, INC**

805 Midland Bldg, Billings

Pres: Charles I Kolstad

VP: R N Lutes

Sec-Treas: William G Mount

**BIG TIMBER CREEK MINE,** undergr., Pb, Ag, Au

Gen Mgrs: Charles I Kolstad &

Wm G Mount

Under devel

**HALF MOON MINE, Independence**

Dist, Au, Ag, Pb

Idie

**HAND MINE**

Argenta

Own & Oper: John Hand, Dillon

**MAULDEN MINE,** Argenta Dist, Ag, Au, Pb, Cu, Zn

Mine Supt: Bill Hand, Dillon

Under devel (Prod two care weekly)

**IRON MT CLAIMS,** adjoining mine

Own: John & Bill Hand

Under devel

**HERR, F E**

Box 388, Dillon

**CHARTER OAK MINE,** Blue Wind dist, Beavertail City, Ag, Pb

Under devel

**LEHMAN, WALTER**

805 W Main St, Lewiston

**SIR WALTER SCOTT MINE,** 70 mi W of Lewiston, undergr., Ag, Pb, Cu, Zn, Au

Under devel

**AMERICA MINE,** 26 mi NE of Lewiston, undergr., Pb, Ag, Au, Fluorite

Under devel

**WAR EAGLE MINE,** 20 mi E of Lewiston, undergr., Zn, Pb, Ag

Under devel

**CHRISTOPHER COLUMBUS MINE,** undergr., Au, Ag, Pb, Cu

Under devel

**GOLD BUG MINE,** undergr., Au, Ag, Cu

Under devel

**LITTLE ROCKIES MNG & DEVEL CO**

Landusky

Pres: Frank B Bryant

VP: Edward F Wigleland

Sec & Treas: Cecil Flinders

Purch Agt: Marion Heller

**LITTLE BEN MINE,** Landusky,

## Nebraska

**undergr., Au, Ag**  
**Gen Mgr: Marion Holler**  
**Supt: E E Wingfield**  
**Geol: Barney Egli**  
**Prod: 100 tons**  
**100-TON FLOT & CYAN MILL,**  
**Laodusky**  
**Gen Mgr: Marion Holler**  
**Mine Eng: Frank B Bryant**

**LISBON URANIUM CORP**  
**304 Int Security Bldg, Salt Lake City, Utah**  
**Dist Eng: R L Christie**  
**BICE LEASE, U<sub>3</sub>O<sub>8</sub>**  
**PRYOR MTN MINE, U<sub>3</sub>O<sub>8</sub>**  
**(See Colo, N Mts, Utah, Wyo)**

**LUKE, RUSSELL B**  
**1081 Front St, Butte**  
**JACK PINE PHOSPHATE MINE,**  
**8 mi NE of Elkhorn, undergr.**  
**Under devel**  
**LUCKE'S SILICA QUARRY, 6 mi W**  
**of Anaconda, open pit**

**MINERALS ENG CO**  
**MONTANA TUNGSTEN DIV**  
**30 S Montana, Dillon**  
**Pres: Blair Burwell**  
**VP: Ray Sullivan**  
**Gen Supt: E M Craig**  
**Purch Agt: R W Warren**  
**Mine Supt: D E Aro**  
**BROWN'S LAKE MINE, 8 mi NW**  
**of Gian Hill, open pit, WO<sub>3</sub>**  
**idie**

**CALVERT TUNGSTEN MINE, 7 mi**  
**W of Wise River, open pit, WO<sub>3</sub>**  
**Prod: 4000 tons**  
**CARTER IRON MINE, 8 mi E of**  
**Dillon, Fe**  
**Under devel**  
**1,000-TON FLOT MILL, 5 mi NW**  
**of Glen**  
**(See Colo, N Mts, Utah)**

**MATERIALS EXPLORATION**  
**DEVEL CO**  
**Box 41, Bozeman**  
**Pres: Peder Strom**  
**VP: John Jardine**  
**Sec & Gen Mgr: Thomas G McGrath**  
**MINE, (Lease & Bond on various**  
**claims), undergr., placer, Au, Ag,**  
**WO<sub>3</sub>**  
**Gen Mgr: T G McGrath**  
**Geol: Emily Abodie**  
**Mine Supt: Peder Strom**

**MONTANA GOLD & CHEM CO**  
**c/o Montana Chem & Mfg Corp,**  
**325 2nd Ave, Edgemont, S Dak**  
**VP: William J Kinick**  
**RESERVOIR, Gold Creek, Powell**  
**County, placer, Au, Ag**  
**ROGERS HOMESTEAD MINE,**  
**Powell County, Au, Ag**  
**Mine Supt: Alden Trimble**

**MONTANA IRON MINING CO**  
**P O Box 423, Stanford**  
**Pres: Dewey F Whittaker**  
**VP & Treas: Lemuel G Wingard**  
**Sec: Gall B Whittaker**  
**Purch Agt: Norman Nelson**  
**DEWEY MINE, open pit, Fe**  
**Supt: Norman Nelson**  
**Prod: 10000 tons**  
**MILL, 18 mi S of Stanford**

**MONTANA MNG & ENGR CO**  
**Box D D, Philipsburg**  
**Pres & Geol: F S Neal**  
**VP & Sec: E T Irvine**  
**BAGDAD MINE, 20 mi N of Phillipsburg, undergr., Au, Ag, Pb**  
**Maps & Surveys: E T Irvine**  
**Mine Supt: F S Neal**  
**Asst Mine Supt: E T Irvine**  
**Idle**

**MONTANA PHOSPHATE PROD**  
**Garrison**  
**Pres: R B Sheddell**  
**ANDERSON MINE, 11 mi NW of**  
**Garrison**  
**GRAVELEY, GIMLET & LUKE MINES,**  
**9 mi NW of Avon, undergr & open pit,**  
**phosphate rock**  
**Gen Supt: F E Burnett**  
**Mine Supt: C W Moon**  
**Mine Frm: C B McDonald, L Brander**  
**Geol: L V Bell**  
**Mine Eng: A M Scott**  
**Prod: 10000 tons**

**MONTANA MNG & MLG CO**  
**412 Power Block, Helena**  
**VP & Gen Mgr: Jack Vandenberg**  
**Sec-Treas: Jean M Hilmen**  
**VP: Louis Ditchik**  
**EMPIRE GROUP MINE, Hitmen,**  
**Marysville dist, undergr, Au, Ag,**  
**Pb, Cu**  
**Gen Supt: T Vern Miller**

**Geol: Richard Miller**  
**Prod: 150 tons**  
**FLOT MILL, Hitmen**  
**Under devel**

**MONTANA RAINBOW MNG CO**  
**Marysville**  
**Owner: W R Wade**  
**Gen Supt: John Brophy**  
**DRUMLUMMON MINE, Marysville,**  
**undergr, Au, Ag**  
**idie**

**MONTANA STANDARD MNG CO**  
**Wallace**  
**Pres: Loy L Vose**  
**MONTANA STANDARD MINE, Prospect**  
**Cr dist, Sanders City, Ag, Pb, Zn,**  
**Au, Cu**  
**MUS BROS**  
**Cooke**  
**Opn: B B Mus, V E Mus**  
**BIG BLUE, ST JUDE, GT RIPT,**  
**undergr, Ag, Pb, Zn**  
**Bluffdale-Lassel**  
**Under devel**

**NANCY LEE MINES, INC**  
**410 Main St, Kellogg, Idaho**  
**IRON MT & NIGHT OWL MINES,**  
**Mineral County, Ag, Cu, Pb**  
**NANCY LEE GROUP, Superior,**  
**undergr, Ag, Cu, Pb, Zn**  
**KING & QUEEN MINES, Ag, Cu, Pb,**  
**Zn**  
**125-TON FLOT MILL**  
**idie**

**NAT'L LEAD CO, BAROID DIV**  
**Box 1975, Houston 6, Texas**  
**GREENOUGH PLANT, jiggng, grind-**  
**ing**  
**Mine & Mill Supt: J P Murphy**  
**(See Ark, Kansas, La, Mo, Mo,**  
**N Y, Tenn, Tex, Wyo)**

**NONPAREIL MINING CO**  
**c/o Claude H Bielenberg, Overlook**  
**NON PAREIL MINE, Deer Lodge, 6**  
**mi East of Missoula, undergr, open**  
**pit, Pb, Ag, Au**  
**idle**  
**NORTH STAR GROUP A**  
**c/o B E Nichols, RFD 1, Teston**  
**BLACKHAWK & NORTHSTAR MINES,**  
**RFD, Teston, undergr, Ag, Au, Pb,**  
**Zn**  
**Under devel**

**NORTHERN MNG & MLG CO**  
**Eustisman**  
**Pres: Paul I Raber**  
**VP: Loren Anderson**  
**Sec: C L Foster (Mng), Wm C Davis**  
**(Mng)**  
**Treas: P C Bakkes**  
**HAWKEYE MINE, Little Rockies dist,**  
**Au, Ag, Cu**  
**RUBY GULCH, Au, Ag, Cu, Pb**  
**(Leased from Gold Reserve Mng Co,**  
**Box 541, Bozeman)**

**PEURA, LOUIS**  
**1124 6th Ave, Helena**  
**BASIN JIB GROUP, Basin dist, Au,**  
**Ag, Cu, Pb, Zn**  
**HELENA & SILVER COIN MINES,**  
**Scratch Gravel dist, Lewis & Clark**  
**County, Au, Ag, Cu, Pb, Zn**  
**Under devel**

**HOPE & FAITH MINES, Montana**  
**City dist, Jefferson County, Au, Ag,**  
**Cu, Pb, Zn**  
**idle**

**JULIA MINE, Scratch Gravel dist,**  
**Lewis & Clark County, Ag, Cu, Zn**  
**idle**

**LIVERPOOL DUMP, Clancy & Lump**  
**Gulch dist, Jefferson County, Ag, Cu,**  
**Pb, Zn**  
**idle**

**WHITLATCH MINE, Helena dist,**  
**Lewis & Clark County, Ag, Cu**  
**MORNING STAR MINE, Amazon dist,**  
**Jefferson County, Ag, Au, Pb, Zn**  
**idle**

**CLEVELAND MINE, Jefferson City**  
**dist, Au**  
**idle**

**NICK & DICK MINE, Canyon Ferry,**  
**undergr, Pb, Ag, Cu**  
**Prod: 10 tons daily**

**PIONEER CORP**  
**Box 74, Missoula**  
**Pres: J S Barrett**  
**VP: Robert Ferris**  
**Sec-Treas: Carl Nicholson**  
**COOK MINE, Bonita, Missoula County,**  
**open pit, Mn**  
**idie**

**ARROWHEAD MINE, Cramer Cr dist,**  
**Ha**

**RALLS & HARRIS BROS**  
**Radersburg**  
**IRON CROSS MINE, Broadwater**  
**County, Fe**  
**Prod: 45 tons**

**RALLS, JOHN M & ELSIE L**  
**Radersburg**  
**NORTH BUTTE MINE, Radersburg,**  
**undergr, Pb, Au, Ag**  
**Under devel**

**RELYEA, GEORGE A**  
**Box 88, Garrison**  
**RELYEA MINE, 11 mi N of Garrison,**  
**undergr, phosphate**  
**Prod: 3,500 tons**  
**KLINE SCHMIDT MINE, Winona,**  
**undergr, Pb, Ag, Au, Zn**  
**Gen Supt-Mine Frm: Wm Hendrickson**  
**idle**  
**Elliott Minal**

**RODON RESEARCH CORP**  
**Rutherford**  
**Pres & Purch Agt: Wade V Lewis**  
**VP: Theodore Nyquist**  
**Sec-Treas: J T Lewis**  
**URANUM MT MINE, Boulder**  
**INDIANHEAD URANIUM MINE, Basin,**  
**undergr, U<sub>3</sub>O<sub>8</sub>**  
**Mine Frm: Gilbert Holstue**  
**Rogers, Norman**  
**Box 1719, Helena**  
**MIKE HORSE MINE, 20 mi E of**  
**Lincoln, undergr, open pit, Ag, Pb**  
**Under devel**  
**(See Utah)**

**RUSKIN MNG CO**  
**83 E Park, Butte**  
**Pres & Mine Eng: Kenneth M Judd**  
**VP & Geol: Russell B Luke**  
**Sec-Treas: Harriet Judd**  
**LUKE JUDIL SILICA QUARRY, 5**  
**mi W of Anaconda, open pit, silica**  
**Prod: 8,000 tons per year**

**SILVER CRESCENT MNG CO**  
**INC**  
**Box 295, Helena**  
**Pres & Gen Mgr: William A Hall**  
**VP: Louis Peura**  
**Sec: Albert Lundborg**  
**CRESCENT, PEERLESS & SILVER**  
**CRESCENT MINES, 23 mi S of**  
**Helena, Au, Pb, Ag, Cu, Zn**

**SIMPLOT CO, JR**  
**FERTILIZER DIV**  
**Box 912, Pocatello, Idaho**  
**Pres: J R Simplot**  
**VP & Gen Mgr: W Grant Kilbourne**  
**Purch Agt: Paul Lestrom**  
**CENTENNIAL MINE, Monida, 38**  
**mi E of Monida, open pit, phosphate**  
**Res Mgr: P T Peterson**  
**Prod: 2,000 tons**  
**(See Idaho, New, Wyo & Warren**  
**Dredging Corp in Idaho)**

**SWANSEA MINES, INC**  
**Box 904, Helena**  
**Pres & Gen Mgr: C L Hewitt**  
**SILVER BELL MINE, 40 mi NW**  
**of Helena, undergr, Au, Ag, Cu, Pb**  
**idle**

**TEXAS-MONTANA MNG CO**  
**Minarch**

**SILVER BELLE MINE, Montana dist,**

**Ag, Pb, Zn**

**TAYLOR-KNAPP CO**  
**Box FF, Philipsburg**  
**Pres: S R Knapp**  
**VP & Gen Mgr: A V Taylor**  
**Sec & VP: C L Kremer**  
**Mgr: Donald S Johnson**  
**Ch Eng: Charles P Knobel**  
**MOORLIGHT GROUP, TRUE FISSURE**  
**& DU RANGUE MINE, Philipsburg,**  
**undergr, Mn, Ag, Zn, Pb, Cu**  
**Gen Supt: Jack B McCoy**  
**Geol & Eng: M D Regan**  
**Ch Accountant: Claude Sorensen**  
**Mine Frm: C H Reistad**  
**100-TON GRAV-MAG MILL, Philipsburg**  
**Mill Frm: G Knoble**  
**Assay: F S Neal**

**TRI STATE MINERALS CO**  
**2001 Lincoln St, Ogden, Utah**  
**Own: W K Skeoch**  
**KEYSTONE, TREASURE & SMITH**  
**TALC MINE, Dillon, open pit, Talc**  
**Gen Mgr: J R Pyner**  
**Gen Supt: Ernest Nygren**  
**Geol: C F Joy**  
**Mech Eng: Wm Brown**  
**Prod: 50-75 tons**

**UMONT MNG CO, INC**  
**505 Silver Bow Bldg, Butte**  
**Pres: L P Evans, Jr**  
**VP: D D Wheeler, Jr**  
**Treas: R H Wacham**  
**NORWICH MINE, 2 mi W of Butte,**  
**undergr, Mn, Ag**  
**Gen Mgr: D P Wheeler, Jr**  
**Res Mgr: Wilbur F Cristell**  
**Mine Supt: Chas F Bissell**  
**LITTLE SARAH MINE, Summit Valley**  
**dist, Mn**

**URANIUM CORP OF AMERICA**  
**527 Failing Bldg, Portland 4, Ore**  
**Pres: Graham Griswold**  
**VP: A L Mather**  
**Sec-Treas: W F Meyer**  
**DAILY COPPER MINES, Wicks,**  
**undergr, Cu, Pb, Zn, Ag, Au**  
**Mine Supt: Steve J Giulio**  
**Under devel**

**VARELLA MNG CO**  
**c/o Sam Varella, 521 Shields**  
**Ave, Butte**  
**EASTER MINE, Silver Bow dist, Mn**  
**SILVER CLEFT MINE, Summit Valley**  
**dist, Mn**

**VERILITE MINES INC**  
**Box 132, Hamilton**  
**Pres: Harry R Fleishman, Jr**  
**VP: Robert Holt**  
**Sec-Treas: L D Bryson, Accr**  
**Purch Agt: Robert Chamberlain**  
**DONNA-LOU MINE, Box 132, Hamilton,**  
**open pit, Vermiculite**  
**Gen Mgr: R Chamberlain**  
**MILL (35 TON), being built at mine**  
**Under devel**

**VICTOR CHEMICAL WORKS**  
**155 N Wacker Dr, Chicago 6, Ill**  
**Supt: L O Streitmaier**  
**Prod Supt: C Hendrickson**  
**Supt, Mng Oper: Henry Johnson**  
**MINE, Maiden Rock, undergr,**  
**phosphate rock**  
**ELEMENTAL PHOSPHORUS PLANT,**  
**Silver Bow, Electric Furnacing**  
**(See Fla, Ill)**

**YELLOWSTONE URANIUM CO**  
**Box 516, Hardin**  
**Pres: A A Moser**  
**VP: Dean Cummins**  
**SHAMROCK MINE, Silverstar, undergr,**  
**Cu, Au, Ag**  
**Under devel**

**YOUNG-MONTANA CORP**  
**2223 1st Ave, Hibbing, Minn**  
**Pres: Joseph Lovato**  
**Sec-Treas: Thomas McCabe**  
**WILLOW CH MINE, Stanford, 18 mi**  
**N of Stanford, open pit, Fe**  
**Mine Frm: Phil Sonstrom**

**ZODIAC URANIUM, INC**  
**320 Ness Bldg, Salt Lake City, Utah**  
**Geol: Leland J Davis**  
**Prop near Dillon, Pb, Cu, Au, Ag**  
**Under devel**  
**(See Ariz)**

**ZONOLITE CO**  
**135 S LaSalle St, Chicago 3, Ill**  
**Pres: J B Myers**  
**VP, Chg Prod: J A Kelley**  
**VERMICULITE MTN MINE, Libby,**  
**open pit, vermiculite concentrates**  
**Gen Mgr: R A Bleich**  
**Asst Gen Mgr: E D Lovick**  
**Geol: R J Kujawa**  
**Mech Eng: D W Robinson**  
**Mkt: J B Calkins**  
**Purch Agt: B J Dorrington**  
**Mine Supt: Orville Thorne**  
**3,000-TON GRAV MILL, near Libby**  
**Mill Supt: Harold Flatt**  
**Mill Frm: Walber Baker**  
**(See Ill)**

## NEBRASKA

**AMER SMLTG & REF CO**  
**OMAHA SMLTR & REFINERY**  
**Omaha**  
**Mgr: Ray C Show**  
**Gen Supt: J C Reinhardt**  
**(See Ariz, Calif, Colo, Idaho, Ill, Kan,**  
**Md, Mont, N J, N Mex, N Y, Tex,**  
**Utah, Wash & Federal Mng & Smelting**  
**Co, Mo)**

## NEVADA

### ALLIED OIL & MINERALS CO

409 Ness Bldg, Salt Lake City  
Utah  
Pres: P C Lyon  
Gen Mgr: P C Lyon, Jr  
GOLD NOTE MINE, 57 mi S of Winnemucca, undergr., Pb, Ag, Au, Zn, Cu  
Under devel

### AMERICAN CANYON MINES

255 Main St, Lovelock  
Own: Harry H Herman  
**AMERICAN CANYON MINE**, Rochester Mining dist, 8 mi E of Oreana in American Canyon, undergr., open pit, Hg, Au, Kaolin  
Gen Mgr: Harry H Herman, Jr  
Ass't Gen Mgr: Peter D Wulfsohn  
Miner: Fred E Nibley  
Under devel  
200-TON GRAV MILL, at mine  
REFINERY, at mine  
Metal output: 800 lbs of Hg daily

### ANACONDA COMPANY, THE

YERINGTON MINES  
Box 1000, Weid Heights  
Gen Mgr: A E Miller  
Ass't Gen Mgr: H R Burch  
Mine Supt: C J Houck  
Plant Supt: A J Gould  
Gen Min Fmn: D K Gill  
Gen Plant Fmn: F M Monninger  
Ch Clerk: H L Cheskarek  
Pers Supervisor: H W Humphreys  
Storekeeper: R K Owen  
Master Mech: R E Bentley  
Superv Rep & Maint of Mobile Equip:  
W M Cross  
Ch Elect: M H Bissett  
YERINGTON MINE, 81 mi SE of Reno, surface, Cu  
Prod: 12,000 tons  
12,000-TON LEACH & PRECIP PLANT  
(See Calif., Idaho, Mont., N Mex., N.Y., Utah)

**APEX MINERALS CORP**  
317 Clay Peters Bldg, Reno  
Pres: Carson Frazinelli  
VP: Wm Crowell  
Sec: Walter Nasimith  
Purch Agt & Gen Supt: A A Carrey  
Gen Mgr: Ben Yoffee  
Geol: Phil D Wilson, Harry Hughes  
Met: Albert Silver  
**APEX URANIUM MINE**, Austin, U<sub>3</sub>O<sub>8</sub>  
300-TON MILL, Austin

**AQUAFIL CO**  
Box 134, Fernley  
Supt: Lowell Smith  
**AQUAFIL MINE**, 35 mi NE of Fernley, diatomaceous earth  
**CHICK BED MINE**, 27 mi NE of Fernley, diatomaceous earth  
MILL, Fernley

### ARGENTUM MNG CO OF NEVADA

Box 151, Mina  
Pres & Purch Agt: E S Gates  
VP-Treas: C E Earl  
Sec: J A Crowther  
Ass't Sec: C E Earl  
**NORTHERN BELLE-HOLMES-MT DIABLO**, Candelaria, undergr., open pit, Au, Ag, Pb, Zn  
Gen Mgr & Metal: E S Gates, Jr  
Ass't Gen Mgr: Judd Hancock  
Gen Supt: C E Earl  
Prod: 250 tons  
**FLOT MILL**, Columbus Marsh  
Under const

**ATLANTA GOLD & URANIUM CO**  
Box 248, Pioche  
Pres: J E Little  
VP & Gen Mgr: C E Colline  
Sec-Treas: Wm R Robertshaw  
**ATLANTA MINE**, 51 mi NW of Pioche, Atlanta dist, open pit, Au, Ag, U<sub>3</sub>O<sub>8</sub>  
Consult Eng: Roy A Hardy  
Under devel

**BAKER LAND TRUST**  
Lida Via Goldpoint  
Pres: J S Wisdom  
VP: W J Dear  
Sec-Treas: Helen Wisdom  
Purch Agt: Bob Cosand  
**BAKER PLACER MINE**, Baker, placer, Zn, Au, Ag, U<sub>3</sub>O<sub>8</sub>, Titanium  
Mine Supt: Ollie Olsen, Dudley Galley  
Ass't Mine Supt: Leo Brown  
Mine Frmr: Edw Schmidt  
Under devel

### BARIUM PRODUCTS, LTD (SUBSID OF FOOD MACH & CHEM CORP)

Battle Mountain  
Gen Mgr: G M Stark  
Gen Supt: A L Allen  
**MT SPRINGS & ARGENTA MINE**, 22 mi S of Battle Mt, surface, barite  
Mine Supt: James Jury  
Mine Frmr: C M Lauritsen  
Prod: 200 tons  
(See Barium Products, Calif; Inter-mountain Chem, Wyo)

### BASIC, INC

Box 4, Gabbs  
Works Mgr: H P Willard  
Mine Supt: A M Dixon  
Mill Supt: F W Menzel  
Purch Agt: R A McDonald, Jr  
**GABBS MINE**, surface, magnesite, Brucite  
Prod: 500 tons  
(See Calif.)

### BIG FOUR MNG & MLG CO

P O Box 218, Lomita, Calif  
MINE, Nipton, open pit  
(See Calif.)

### BLUE DIAMOND CORP

1650 S Alameda St, Los Angeles, Calif  
Pres: N J Hardmond  
VP: W G Bradley  
Sec: T L Donoghue  
Purch Agt: B M Maritz  
**BLUE DIAMOND MINE**, Blue Diamond, undergr., open pit, gypsum  
Gen Mgr: H L Waldbauer  
Ass't Gen Mgr & Mech Eng: R H White  
Elect Eng: Robt Dunegan  
Geol & Supt: Joe Cain  
Prod: 1,400 tons  
1,400-TON MILL, at mine

### BRADLEY MNG CO

660 Market St, Rm 515  
San Francisco 4, Calif  
Pres: Worthen Bradley  
Exec VP: John D Bradley  
VP: Jas P Bradley  
Sec: G C Orion  
**GOLDBANKS MINE**, Winnemucca, surface, Hg  
Cons Eng: T C Haggard  
Leased  
(See Calif., Idaho)

### BRISTOL SILVER MINES CO

218 Felt Bldg, Salt Lake City 1, Utah  
Pres: George W Snyder  
VP: Edward H Snyder  
Sec-Treas: C M Christensen  
**BRISTOL SILVER MINE**, Pioche undergr., Cu, Ag, Pb, Zn, Au, Mn  
Gen Mgr: Byron S Hardie  
Gen Supt: Hoyt Adair  
Purch Agt: Hoyt Adair  
Prod: 50 tons

### COLUMBIA MINE

Box 126, Ely  
Gen Mgr: Sam M Robison  
**MINES**, 1 mi E of Ruth, undergr., Mn, Zn, Pb, Cu, Ag  
Producing

### COMBINED METALS REDUCTION CO, NEVADA OPERATIONS

Pinche  
Gen Mgr: Paul Gemmill  
Ass't Mgr: H E Swanson  
Gen Mine Supt: R G Lee  
**CASELTON MINE**, 3 mi W of Pioche, undergr., Zn, Pb, Ag, Mn  
Mine Frmr: J L Stewart  
Mile  
**COMET MINE**, 20 mi W of Pioche, undergr., Zn, Pb, Ag, WO<sub>3</sub>  
Idle

700-TON CASELTON MILL, FLOT-MHS, Zn, Pb, Ag, Mn  
400-TON PANACALITE MILL, Crushing & grinding, crude perlite  
(See Utah)

### COMSTOCK URANIUM & OIL CORP

211 Phillips Petroleum Bldg,  
Salt Lake City, Utah  
**BRETZ MERCURY MINE**, PARENTZ-COMSTOCK MNG VENTURE, (See Oreg., Utah)

### CONSOL COPPERMINES CORP

Kimberly  
Gen Mgr, Explor: Arthur J O'Connor  
(Nevada properties purchased by Kennecott Copper Corp, See N Y)

### CONSOL EUREKA MNG CO

Eureka  
Gen Mgr: Sherman B Hinckley  
Ass't Gen Mgr & Mine Supt: Dean P Thiriot  
**DIAMOND MINE**, 2 mi from Eureka, undergr., Pb, Ag, Au  
Prod: 25-30 tons  
(See Utah)

### COPPER HILL MINE

1235 Palisade Drive, Reno  
Own: Harve P Nelson, James C Schenk, Robert C Schenk  
**COPPER HILL MINE**, 16 mi N of Reno, undergr., open pit, Cu, WO<sub>3</sub>  
Mile

### CORDERO MNG CO

131 University Ave, Palo Alto, Calif  
VP: S H Williston  
**CORDERO MINE**, McDermitt, 12 mi SW of McDermitt, undergr., Hg  
Gen Mgr: J Eide Gilbert  
Ass't Gen Mgr: Verne P Haas  
Gen Supt: Bert Mitchell  
Supt: Cliff Atiles  
100-TON MILL, at mine  
RETORET FURNACE, at mine  
(See Calif., Idaho, Oregon)

### COURVOISIER, CHAS H (OWN)

Box 470, Susanville, Calif  
**TICK CANYON MINE**, Washoe County, undergr., U<sub>3</sub>O<sub>8</sub>  
Gen Mgr & Mine Supt: A G Van Gaalen  
Under devel

### DAKIN, FRED H

2811 Hillsdale Dr, Burlingame, Calif  
**CERVANTINE MINE**, 23 mi E of Lovelock, undergr., Sb  
Idle

### DE LONGCHAMPS, F J

Box 2244, Reno  
**TALAPOOSA MINE**, 15 mi S of Fernley, Au, Ag  
Idle

### DODGE CONSTRUCTION, INC

Box 268, Lovelock  
**MINE**, 25 mi SE of Lovelock, open pit, Fe

Supt: Frank H Dunn

### EAGLE-PICHER CO

INSUL DIV  
Box 1860, Reno  
Gen Mgr: John W Kenney, Jr  
Ass't Gen Mgr: Byron S Steinheimer  
**CELATOM MINE**, Clark Station, open pit, diatomaceous earth  
Mine Supt: H C Smith  
MILL, Air classification, at mine  
Mill Supt: Frank J Dodich  
(See Ill., Kans., Ohio, Okla., Wis.)

### EDGEMONT MNG CO

Tuscarora  
Gen Mgr: T C Hedlund  
**EDGEMONT MINE**, undergr., Au  
Under devel

### ELY VALLEY MINES, INC

Flodde  
Pres & Gen Mgr: John Janney  
Sec: Sherman Hickman  
Supt: Bruce Condie  
**ELY VALLEY MINE**, undergr., Zn, Pb  
Idle

### ERRINGTON-THIEL MNG CO

Ruby Valley  
Part: Oscar T Errington  
Mrs Alma T Errington  
**BIG MICA MINE**, Ruby Valley, 65 mi SW of Wells, undergr. & surface, ruby mica, beryl, rare minerals  
**HOLIDAY COPPER MINE**, 50 mi S of Wells, undergr. & surface, Cu, Zn, rare minerals  
Under devel

### EUREKA CORPORATION, LTD

Eureka  
Pres: A J Anderson  
VP & Man Dir: Neil O'Donnell  
Sec: A C Callow  
Treas: P W Zeckhausen  
Purch Agt: Willis A DePauli  
**RICHMOND-EUREKA MINE**, 2 mi W of Eureka, undergr., Pb, Au, Ag, Zn  
Gen Supt: Robert N Breckinridge  
Mine Supt: Vernon Mans  
Mine Eng: Walter Paroni

### FAIRHAVEN URANIUM MINES INC

Box 261, Lovelock  
Pres & Gen Mgr: Gene Jack  
VP: Fred M Jaquith  
Sec-Treas: B M Andrews

**LINCOLN HILL MINE**, Rochester  
Mng dist via Oreana, 20 mi E of Lovelock, undergr., U<sub>3</sub>O<sub>8</sub>, Au, Ag  
Mine Frmr: Ernest Albrecht  
Under devel

### FIBREBOARD PAPER PROD CORP (FORMERLY PABCO PRODUCTS, INC)

Box 2035, Henderson  
**WHITE EAGLE MINE**, 8 mi NW of Henderson, open pit, gypsum  
Supt: Geo A Mayer  
MILL, at mine

### GABBS EXPLORATION CO

Drawer L, Gabbs  
Pres: Lee D Dougan  
VP: Ellen M Dougan  
**VICTORY TUNGSTEN MINE**, 8 mi N of Gabbs, undergr., scheelite  
Mine Frmr: Charles Bentz  
Prod: 100 tons  
100-TON GRAV-FLOT MILL, Gabbs  
Mill Supt: W M Dougan  
Idle

### GARDNER MINES

Box 413, Ely  
Gen Mgr: C A Gardner  
**MINERAL FARM & MERRIMAR GPS**, 20 mi SE of Ely, undergr., Au, Ag, Pb, Zn  
Prod: 5 tons

### GETCHELL MINE, INC

Box 2520, Reno  
Pres: George Wingfield  
VP & Gen Mgr: N H Getchell  
VP & Cons Eng: R A Hardy  
Sec-Treas: T L Wilcox  
Gen Supt: Keith Kunze  
**GETCHELL MINE**, Golconda, undergr. & surface, WO<sub>3</sub>  
Mine Supt: Wm J Newman  
Ass't Mine Supt: Elmer Snell  
Met: Roy Noyima  
Prod: 900 tons  
1,500-TON FLOT MILL, near Golconda  
Mill Frmr: David Kinzel  
Idle

### GOLDFIELD CONSOL MINES CO

Box 2520, Reno  
Pres: George Wingfield  
Exec VP: Willis A Swan  
Sec-Treas: Geo M Spalding  
(See Calif., Wash)

### GRAND DEPOSIT MNG CO

409 Ness Bldg, Salt Lake City, Utah  
**GRAND DEPOSIT MINE**, Ely, undergr., Pb, Zn, Cu, Ag, Au  
Gen Supt: Paul C Lyon, Jr  
Idle

### GRANDVIEW MNG & MLG CO

Goldpoint  
Pres & Gen Mgr: J S Wisdom  
VP & Sec: Helen Wisdom  
Treas: E J Dear  
Purch Agt: Bob Cosand  
Geol: Karl Desselhorf  
Met: E Eisenhauer  
GRANDVIEW MINE, Oasis, undergr., open pit, Au, Ag, WO<sub>3</sub>, Pb, Zn, Cu, Talc  
Mine Supt: Smoke Smith  
Ass't Mine Supt: Jack Foutch  
Mine Frmr: B C Beone  
Prod: 20 tons  
PALMETTO MINE, Palmetto, Talc (Cosmetic grade)  
WELLINGTONS MINE, Tule Canyon, undergr., open pit, steatite-cosmetic-pharmaceutical talcs, ceramic talc  
Mine Supt: Bill Sutton  
Mine Frmr: Frank Gomez  
Idle  
15-TON GRAV MILL, Palmetto  
Idle

### GRANO-LITE GOLD MNG CO

Box 327, Yerington  
Pres & Gen Mgr: W E State  
VP: John W Barrett  
Sec-Treas: Lynne L Turner  
**GRANO-LITE URANIUM MINE**, 17 mi SE of Wellington, undergr., U<sub>3</sub>O<sub>8</sub>  
Idle

### INDUSTRIAL MINERALS & CHEMICAL CO

6th and Gilman Sts, Berkeley 10, California  
Pres: L R Moretti  
VP: W S Cowgill  
Sec-Treas: A L Forbes  
**JUPITER MINE**, Lyon County, open pit, clay  
(See Calif.)

**Nevada****ISABELL CONST CO**

Box 2351, Reno  
Pres: C V Isbell  
Ch Eng: H R Noel  
Purch Agt: W J Henley  
THREE KIDS MINE, open pit, contract  
mng for manganese, Inc  
Supt: Lloyd Sampean  
(See Ariz, Idaho, Utah, Wash)

**KENNEDY COPPER CORP  
NEVADA MINES DIV**

McRill  
Gen Mgr: J C Kiernan, Jr  
Asst Gen Mgr: M J O'Shaughnessy  
Purch Agt: W N Ireland  
Dir Controller: R W Crosser  
RUTH PIT, VETERAN MINE, Ruth,  
open pit, Cu, Ag, Mo  
Pit Supt: Frank Quilic  
Asst Ch Eng: L A Green  
DEEP RUTH MINE, Ruth, undergr,  
Cu, Ag, Mo  
Undergr Mine Supt: B C Niessel  
21,000-TON FLOT CONCENTRATOR,  
2 REVERB SMELTERS, McGill  
Concen Supt: W J Albert  
Smelt Supt: W Pocout  
Mech-Elect Supt: W K Sanders  
Prod: 100,000,000 lbs Cu yrly  
NEVADA NORTHERN RY (Subsidiary)  
Gen Supt: H M Peterson  
TRIPOLI COPPER PIT & INTERESTS  
IN LIBERTY PIT & VETERAN,  
Kimberly (Purchased from Consolidated Coppermines Corp, Kimberly)  
(See Ariz, N Mex, N Y, Utah)

**L & N MNG CO**  
1129 10th Ave N, Seattle 2, Wash  
Pres: W J Logus  
TRENTON CANYON COPPER MINE,  
Battle Mt, undergr, open pit, Cu, Ag,  
Pb, WO<sub>3</sub>  
Gen Supt: V R Newbury  
Geol: Forbes Robertson  
Under devel  
(See Wash)

**LONDON EXTENSION MNG CO**  
Beowawe  
Pres: Fred C Bishop  
VP: R W Fraser  
Sec & Gen Mgr: H C Bishop, Jr  
Supt & Treas: R B Warmbrodt  
GOLDACRES MINE, 5 mi S of  
Beowawe, surface, Au, Ag  
Supt: E E Mahoney  
Mine Eng: Angelo Manconi  
Prod: 450 tons  
450-TON CYAN MILL, at mine  
Supt: C E Stewart  
Ass't Supt: Harold Bohi

**LOWARY URANIUM MINE CO**  
680 Mt Rose St, Reno  
Pres: Howard E Maxe  
Sec-Treas: Nelle Lowary  
LOWARY URANIUM MINE, open pit,  
Prod: 150 tons  
Under devel

**LUCKY-9 URANIUM INC**  
4275 Neil Rd, Reno  
Pres: F A Denton  
VP: Grant McCoy  
Sec: Mary Agnes Denton  
Treas: Dorothy Bridgeman  
LUCKY-9 MINE, Yerington, undergr,  
surface, U<sub>3</sub>O<sub>8</sub>, Ag, Cu  
Gen Mgr-Ast Mng Supt: R F Denton  
Geol: Arthur Lakes  
100-TON FLOT MILL, Antelope Mng  
dist

**MAGNET COVE BARIUM CO**  
Beowawe  
FIVE PITS, 22 mi S of Beowawe,  
surface, crude barite  
(Leased from Beowawe Barium Prod  
Assn)  
(See Ark, Tex, Wyo, Mo, Fla)

**MANGANESE, INC**  
Box 2008, Henderson  
Pres: Wm M Weaver, Jr  
VP: F A McCougle  
Sec: Hewitt S West  
Treas: J F Wilmett  
Ch Mat: Ellis Gates  
Gen Supt: Robert A Blake  
Purch Agt: L D Richardson  
Gen Mgr: William Kendrick  
THREE KIDS MINE, 6 mi E of  
Henderson, surface, Mn  
Mine Supt: Victor Howard  
Ch Plant Eng: R Waters  
Mine Eng: C Hawkins  
Elec Eng: Russell Firth  
Controller: H M Alarid  
Prod: 1,000 tons  
1,000-TON FLOT MILL, at mine  
Mill Supt: Ed Lowman  
(See NY)

**METALLURGICAL DEVEL CO, INC**

P O Box 101, Gardnerville  
Pres: Emery W Graumke  
VP: Joe Micho  
Sec-Treas: Paul Lovall  
MINE, 12 mi E of Gardnerville  
Pinchot dist, Pb, Ag, WO<sub>3</sub>  
SOUTHERN PACIFIC LEASE-  
ORE, Lovelock, open pit, Fe  
50-TON FLOT-GRAV MILL, at mine  
Mill Supt: Joe C Morris  
Idie

**MINERAL MATERIALS CO**

1145 Westminster Ave,  
Alhambra, Calif  
Gen Mgr: C W Dunton  
Ch Eng: M W Redhead  
Geol: W M LaBounty  
Mine Supt: M C Graham  
Mine Mgr: F W Ledlick  
Mine Frmr: C W Butler  
800-TON MILL, at mine, jaw crusher,  
rolls, magnetic separators  
Mill Frmr: G C Rawlins  
BUENA VISTA MINE, Lovelock,  
surface, Fe  
Prod: 800 tons  
(See Calif)

**MINERVA SCHHEELITE MNG CO**

Box 981, Ely  
Gen Mgr: R Stapper  
SCHHEELITE CHIEF, 50 mi SE of  
Ely, undergr, WO<sub>3</sub>  
Hills  
35-TON GRAV MILL, 40 mi SE of  
Ely

**M & M MINING CO**

1100  
Pres: H P Newman  
Sec: Ed R Moore  
Treas: D A Newman  
COPPER KING GROUP, 3 mi S of  
lone, undergr, Cu  
Under devel

**NATIONAL MERCURY CORP**

225 Main St, Lovelock  
Pres: Harry H Herman, Jr  
VP: David L Wulfsohn  
Sec-Treas: Peter D Wulfsohn  
PERSHING QUICKSILVER MINE, 22  
mi E of Lovelock, Antelope Springs  
dist, undergr, Hg  
Dir of Min Oper: Peter D Wulfsohn  
Gen Mgr: Harry H Herman, Jr  
Hills

**REFINERY, at mine**

Prod: 1,600 lbs daily

**NEVADA IRON ORE CO, INC**

Lovelock  
Pres: H S Thomas  
MINE, 25 mi E of Lovelock, Buena  
Vista dist, open pit, Fe  
(Leased from Southern Pacific Co)

**NEVADA PARK MNG CO**  
P O Box 37, Provo, Utah  
Sec-Treas: Richard Knight  
MINE, Silver Park Mng dist, Lincoln  
County, undergr, Au, Ag  
Hills  
(See Utah)

**NEVADA-MASSACHUSETTS CO**

Tunington  
Pres: C H Segerstrom  
VP: M D Cromwell  
Treas: M D Jones  
Gen Mgr: E Nash  
TUNGSTEN MINE, 8 mi N of Mill  
City, undergr & surface, WO<sub>3</sub>  
Mine Supt: E O'Keefe  
Min Eng: Ralph Gronning  
Part-time  
500-TON GRAV-FLOT MILL  
Mill Supt: J R Caldwell  
Assayer: R V Noble

**NEVADA PERLITE CO**

1414 Industrial Road, Las Vegas  
Pres: James H Bradford  
VP: J A Tiberi  
Sec-Treas: George Von Tobel  
PERLITE PROCESSING PLANT,  
Las Vegas  
Capacity: 10,000 cu ft expanded  
perlite per day

**NEVADA SCHHEELITE CORP**

(Subsidy of KENNAMETAL INC)  
430 S Main St, Fallon  
Pres: Donald C McKenna  
VP & Gen Supt: E M Colwell  
Ast Sec & Purch Agt: Geraldine  
March  
Acct: Monte Leveaux  
Geol & Ass't Supt: Jack Frank  
Mech Eng: K L Colwell

**NEVADA SCHHEELITE MINE,**

Roxville, undergr, WO<sub>3</sub>  
Mine Supt: Harry Manny  
Prod: 140 tons  
150-TON GRAV-FLOT MILL, at  
mine

**Mill Supt: Mark Campbell****NEVADA TUNGSTEN &**

URANIUM INC  
118 Friedman Bldg, Las Vegas  
Pres & Gen Mgr: J Dewey Solomon  
VP: O Polodis  
Sec-Ass't Gen Mgr: Dave Silverman  
Treas: Fred Gillies  
Purch Agt & Geol: James Solomon  
BROKEN RIDGE MINE, Overton,  
undergr, open pit, Th, Carnotite  
Gen Supt: Jack Tappan  
Under devel

**NORTH STANDARD MNG CO**

Box 405, Provo, Utah  
Pres & Gen Mgr: Garth W Manson  
Sec: Robert E Eyre  
NORTH STANDARD MINE, 25 mi NW  
of Naturita, Montrose County, U<sub>3</sub>O<sub>8</sub>  
Mine Frmr: Melvin R Conley  
Under devel

**PETERSON, M F & LORENA**

Box 131, Tonopah  
OLD COWGIRL MINE, 50 mi NE of  
Tonopah, undergr, Au, Ag  
Under devel  
M & M (MERCURY MT) MINE,  
47 mi NE of Tonopah, undergr, Hg  
(Optioned to Two States, Uranium  
Company, Bountiful, Utah)

**RED ROCK MINE CO**

Fish Lake Valley, Tonopah  
Parts: K L Hill, Ray Puccetti,  
Emory Bell, Lewis Peham  
Geo Scott  
MINE, open pit, Hg  
30-TON GRAV MILL, at mine

**RICK, H R & HOALST,**

BLAINE  
Little Mountain  
SILVER CHIEF MINE, 8 mi NE of  
Battle Mt, undergr, open pit, Ag,  
Pb, Au  
Under devel  
MONDAY MINE, Battle Mt, undergr,  
Au, Ag, Pb  
Under devel

**RICK, H R & LAURITZEN**

Battie Mt  
OVERLOOK CLAIMS (8), 5 mi W of  
Battle Mt, undergr, surface, Co,  
Ni, Cu, Ag, Pb  
Under devel

**ROBISON, SAM M & SON**

Box 1268, Ely  
Gen Mgr: Sam M Robison  
Asst Gen Mgr: Donald M Robison  
COLUMBIA & KEYSTONE MINE,  
1 mi E of Ruth, undergr, surface,  
Zn, Pb, Cu, Ag, Mn  
ROBISON URANIUM MINES, Atlanta,  
U<sub>3</sub>O<sub>8</sub>  
Hills  
EAGLE MINE, Lincoln County, 100  
mi S of Ely, U<sub>3</sub>O<sub>8</sub>  
Hills  
ROBISON MINES, 1 mi N of Ely,  
undergr, Zn, Cu, Pb, Ag  
Hills

**ROUND Mtn GOLD DREDGING CORP**

Round Mountain  
Mgr: Sherman Burdick  
PLACERS & MILL, 60 mi N of Tonopah  
Supt: Burton Scheetz  
(Leased from Nevada Prophecy Gold  
Mines, Inc, 10 W 2nd St, Reno)

**RUGLES, A L & SONS**

Cherry Creek  
LAUGHING INDIAN GROUP, 3 mi S  
of Cherry Creek in Egan Canyon,  
undergr, WO<sub>3</sub>  
Under devel

**EXCHEQUER GROUP, 4 mi NW of**

Cherry Creek, undergr & placer,  
Schellise, Au, Ag

**URANIUM CLAIMS, Telegraph mag**

dist  
Under devel

**J R SIMPLOT CO, FERTILIZER DIV**

Box 912, Pocatello, Idaho  
VP & Gen Mgr: W Grant Kilbourne  
Purch Agt: Paul Loestrom  
SIMPLOT IRON MINE, 26 mi S of  
Pocatello, open pit, Fe  
Mine Mgr: John Kope  
Hills

**SIMPLOT SILICA PRODUCTS, INC**

Overton  
Mgr: Keith Madell  
(See Idaho, Mont, Wyo)

**SISKON CORP**

422 Gazette Building, Reno  
Pres: H B Chesser, Sr  
VP: E J Schaefer  
Sec-Treas: J E Chesser  
AMERICAN EAGLE, GLOBE, OLD  
RELIABLE & PRINCE MINES  
(See Ariz, Calif)

**STANDARD SLAG CO**

Box 3, Gabbs  
Pres: L A Beighley  
VP: W E Biles  
Sec-Treas: W H Kilcawley  
Western Mgr: R O Jones  
GREENSTONE MINE, 2 mi E of  
Gabbs, surface magnesia  
Supt: G B Gaylord  
Fr'm: A C Wood  
Prod: 550 tons  
300-TON GREENSTONE MILL,  
Gabbs, Calcining  
Fr'm: W C Burnett  
IRON MT MINE, Gabbs, open pit,  
Fe

Prod: 700 tons  
Mine Supt: G B Gaylord  
Fr'm: C R Corlett  
MINNESOTA MINE, Yerington, open  
pit, Fe  
Prod: 1,000 tons  
Supt: J R Harmon  
(See Ohio)

**STORMY DAY MINES**

435 Hillcrest Rd, San Mateo, Calif  
Pres: Robert N Avery  
VP: Alfred W Stickney  
Sec: M J Scholz  
STORMY DAY MINE, Pershing City,  
undergr, WO<sub>3</sub>  
Hills

**SUMMIT KING MINES, LTD**

Box 632, Fallon  
Pres: Ira B Boralemon

Gen Mgr: Percy G Dobson  
Explor

**SUNBURST URANIUM CORPORATION**

1975 NW Everett St, Portland 8,  
Oreg  
MONARCH CLAIMS, Nye County U<sub>3</sub>O<sub>8</sub>  
Hills  
TRADER HORN MINE, Box 968,  
Tonopah, Nye County, undergr, Au,  
Ag  
Gen Mgrs: J C Young, K Critchlow  
Under devel  
ANTELOPE MINE, Washoe County,  
Open pit, Hg  
Under devel  
(See Oreg, Utah)

**TRIANGLE MINES CO, INC**

426 Bridge St, Winnemucca  
TRIANGLE MINE, 70 mi NW of  
Winnemucca, Bottle Creek dist,  
open pit, Hg  
Supt: Harry Trollope  
FLOT-MILL, at mine

**TUNGSTEN MT MNG CO**

511 Securities Bldg, Seattle 1,  
Wash  
Pres: Bennett W Carter  
VP: Emil Mottman  
Sec: F L Miles  
MINE, Clan Alpine Dist, undergr,  
WO<sub>3</sub>  
Supt: Walter E Delight  
Geol: Arthur Lakes  
Under devel

**UHALDE LEASE**

1975 Palisade Dr, Reno  
Oper-Mgr: John H Uhalde  
ALLADIN MINE, 28 mi SW of Elko,  
undergr, Pb, Ag, Cu  
Under devel  
BONNE MINE, 28 mi SW of Elko,  
undergr, Cu, Ag  
Under devel

**U S LIME PROD CORP**

Box 127, Henderson  
Gen Mgr: John MacDonald  
SLOAN MINE, Sloan, Box A, open  
pit, dolomite  
Gen Supt: Wm E Ellis  
Supt: Geo Rodriguez  
Prod: 800 Tons  
130-TON MILL, Sloan  
APEX MINE, Box 588, N Las Vegas,  
open pit  
Supt: C R Prince  
Fr'm: John Sanger  
Hills

**New Hampshire — New Mexico**

Prod: 3,000 tons  
250-TON MILL, Henderson  
Supt Wm B Mainor  
(See Ariz, Calif)  
  
**WAH CHANG MNG CORP.**  
**LINCOLN MINES DIV**  
Gen Mgr: J J Strutz, Jr  
Asst Gen Mgr: George Reed  
**LINCOLN MINE**, Templete, undergr.,  
Wyo  
Gen Supt: Ed Woods  
Asst Gen Supt: John Russell  
Purch Agt: Wm F Spain  
Mech Eng: Charles Wilson  
Mett Phil McGuire  
Mine Supt: Al Nelson  
Idle  
700-TON GRAV-FLOT MILL, at mine,  
Supt: Allen Hunt  
(See Calif, Colo, N.Y., Tex, & E A Schols  
& J H Cazier, Ariz)

**WESTMINSTER CORP**  
416-20 Nat'l Bank Bldg,  
Denver, Colo  
Pres: David W Adams  
VP: Melvin C Bowles  
VP & Treas: T R Llewellyn  
Sec: Jim T Holman  
**PYRAMID LAKE PROPERTIES**,  
Washee County, U.S.Q.  
Under devel  
(See Ariz, Colo, Utah, Wyo)

**WHEELCHEL MINES CO**  
1019 Arthur St, Caldwell, Idaho  
Pres: William E Wheelchel  
VP: Ralph A Wheelchel  
Sec-Treas: Thressa M Wheelchel  
**NATIONAL MINE**, McDermitt, Nev.  
Ag  
Under devel  
(See Utah)

**WHITE CAPS GOLD MNG CO**  
317 Clay Peters Bldg, 140 N  
Virginia, Reno  
Pres: Carson Frazini  
Sec-Treas: Walter Naismith  
**WHITE CAPS MINE**, Manhattan, As.,  
Sb, Hg  
Gen Mgr: Hugh Cameron  
Gen Supt: George Rounds  
Geol & Met: Albert Silver  
Under devel  
150-TON CYAN MILL, Manhattan

**YOUNG AND CRITCHLOW**  
1976 NW Everett St, Portland 9,  
Oreg  
Own: James C Young, Kay Critchlow  
**COALDALE PROPERTY**, Esmeralda  
County near Coaldale, undergr., U.S.Q.  
Idle

**NEW HAMPSHIRE**

**FOOTE MINERAL CO**  
19 W Chelten Ave, Philadelphia 44,  
Pa  
**COLD RIVER MINE**, Bellows Falls,  
at Cold Riv, undergr, feldspar  
Gen Mgr: George Kneass, Jr  
(See NC, Pa, Va)

**WHITEHALL CO, INC**  
445 Park Ave, New York 23, N.Y.  
Pres: V D Dardi  
Exec VP & Treas: Harry S Adams  
VP & Purch Agt: P B Verplanck  
VP: Jay E Hand  
Sec: D F Cunningham, Jr  
**RUGGLES MINE**, Grafton, surface  
feldspar, mica, beryl, apodumene  
Prod: 30 tons

**NEW JERSEY**

**ALAN WOOD STEEL CO**  
Doyle  
Pres: H R Wood  
VP: Oper: W E Boger  
Sec: W B Cashmore  
Treas: W M Webb  
Purch Agt: Clinton Bishop  
**SCRUB OAKS MINE**, Mine Hill,  
undergr., Fe  
Supt: J P Kerito  
Gen Minn Frm: K Sherbok  
Mine Frm: S J Usinowicz  
Mine Eng: L V Meyers  
Master Mech: Joseph Speicher  
3,500-TON GRAV-MAGNETIC MILL,

at mine  
Gen Mill Frm: N K Karchmer  
Chem: W F McDougal  
**WASHINGTON MINE**, Oxford, undergr., Fe  
Supt: W J Keals

**AMER SMLTG & REFIN CO**  
Barber  
**PERTH AMBOY PLANT**  
Mgr: G H Weis  
Gen Supt: C E Porter  
(See Ariz, Calif, Colo, Idaho, Ill.,  
Kans, Md, Mont, Nebr, N Mex, N.Y.,  
Tex, Utah, Wash, & Federal Mng &  
Smelting Company, Mo)

**NEW JERSEY ZINC CO, THE**  
160 Front St, New York 38, N.Y.  
Ch of Bd: H Hardenbergh  
Pres: R L McCann  
VP, Mng & Explor: S S Goodwin  
Mgr, Purch: W Dunlap  
**MINES**, Ogdensburg, Zn  
Gen Supt: D McMechine  
(See Colo, N Mex, N.Y., Pa, Tenn,  
Va, Wisc)

**RICHARD ORE CO, SUBSID**  
**COLO FUEL & IRON CORP**  
Wharton  
**RICHARD MINE**, near Wharton,  
undergr., Fe  
Supt: Martin Brophy  
Safety Eng: W P Galligan  
Mech Eng: J J Burchko  
Elec Eng: George Gathorn  
Elec: Harry Martin  
600-TON MAGNETIC MILL,  
Supt: P W Keim

**SHAMHOON INDUSTRIES, INC**  
**MT HOPE MNG DIV**  
Box 392, Dover  
**MT HOPE MINE**, undergr, magnetite  
Gen Supt: Harold Christy  
Ch Eng & Geol: Robert Hagerman  
Office Mgr: Laurence James  
Mine Capt: Howard Buckingham  
Prod: 3,000 tons  
1,500-TON FLOT MILL, at mine  
Fr: Preston Davenport  
Assay: Wooten J Bast

**U S METALS REF CO**  
(Subsid of AMER METAL CLIMAX,  
INC.)

81 Broadway, New York 6, N.Y.  
Pres: Hugo de Neville  
VP: E T Rice, L Cole, F H Dyke  
H A Vogelstein, J Vuilleques,  
J Payne, Jr

Sec & Ass Treas: E A Weill  
Treas: Donald J Donahue  
Purch Agt: D Kelher  
Control: H C Cohen

**ELECTROLYTIC SMELTER &**  
**REFINERY**, Carteret  
Gen Mgr: Freeman H Dyke

Asst Mgr: Douglas Tenant  
Prod: 150,000 tons Cu per year  
25,000,000 oz Ag per year  
600,000 oz Au per year

(See Mich & Amer Metal Climax, Inc,  
NY)

**NEW MEXICO**

**AMBROSIA MINERALS, INC**  
763 First Nat'l Bk Bldg,  
Phoenix, Ariz  
**LUCKY STRIKE NO 2 MINE**, Socorro  
County, open pit, Mn  
Idle  
(See Ariz)

**AMERICAN SMELTING &**  
**REFINING CO**  
**SOUTHWESTERN DIVISION**

813 Valley Nat'l Bank Bldg  
Tucson, Arizona

Mgr: T A Snadden  
Asst Mgr: A C Hall  
Ch Geol: Kenyon Richard  
**GROUND HOG UNIT**, Vanadium,  
New Mex, undergr., Pb, Zn  
Supt: L H Chapman  
Idle

**DEMING MLD UNIT**  
400-TON FLOT PLANT  
Supt: B L Rickman

(See Ariz, Calif, Colo, Idaho, Ill, Kans,  
Mont, Nebr, N.J., N.Y., Tex, Utah, Wash,  
& Federal Mng & Smelting Co, Mo)

**ANACONDA COMPANY, THE**  
**NEW MEXICO OPERATIONS**  
Box 638, Grants  
Mgr: A J Fitch

Asst Mgr: E C Peterson  
Gen Mill Supt: W J Roberts  
Asst Mill Supt: T R Beck, A K Veeder,  
W R Stern

Ch Met: Dale C Matthews  
Asst Ch Met: J H Glover

Min Supt: John P Herdon

Asst Min Supt: Floyd Ballantine

Ch Geol: R D Lynn

Mech Supt: T M Fitch

Ch Chem: Jack R Pate

Ch Pilot: Woodrow B House

Ch Clerk: G H Holmgren

Asst Ch Clerk: George Hankinson

Storekeeper: R L Millard

Gen Frm, Crush & Handling Dept:

Amos Leach

Supt, Acid Gen Plant: Wayne Hickson

Ch Elect: M D Barnaby

Fr: Jackpile Mine: B F Barlow,

Stanley Whitty

**JACKPILE MINE**, open pit, Uranium

Ore

Prod: 3500 tons

**SECTION 9 MINE**, open pit, Uranium

Ore

Prod: 50-75 tons

**SECTION 33 MINE**, undergr., Uranium

Ore

Under devel

**3000-TON LEACHING PRECIP MILL**,

Bluewater

(See Calif, Idaho, Mont, Nev, N.Y., Utah)

**ANDERSON BROS CORP**  
600 Coal Ave, SW, Albuquerque

**MANGANESE CHIEF MINE**, Socorro

County, Mn

Supt: Ray C Wood

**MILL**, 25 mi SW of Socorro

Under construction

**BANNER MINING CO**  
2042 Conner Stravenue, Tucson,  
Ariz

Pres: E S Bowman

VP: L L Travis, John M Wallace

VP & Gen Mgr: A B Bowman

Sec-Treas: James E Hogle

Purch Agt: E C Bowman

**BONNEY-MANILA & MISER'S CHEST**

MINES, Lordsburg, undergr., Cu,

Ag, Au

Gen Supt: F M Bowman

Mine Supt: Coleman Dunkerson.

Maas Mech: Arthur B Smith

Under devel

**400-TON FLOT MILL**, at mine

Mill Supt: Fred E Johnson

Assayer: Harold L Cox

(See Ariz)

**BLACK RANGE MNG CO**  
Kingston

Pres: J H Shoopmaker

**SILVER TAIL GROUP & SILVER QUEEN**

GROUP, Sierra County, Ag, Pb, Au,

WO, Zn

Geol: Dr Howard A Meyerhoff

Under devel

**COPPER QUEEN, JACK RAT GROUPS**,

undergr., Ag, Pb, Zn, Au, Cu

Under devel

**BROWN & WALLACE**  
501 Park Ave, Astec

Pres: A R Wallace

VP: M R Wallace

Sec-Treas: Creighton Brown

**BOBCAT MINE**, open pit, U.S.Q.

Gen Mgr: Don Wallace

Asst Gen Mgr: Billy Ross Wallace

Under devel

**CALUMET & HECLA, INC**  
1 Calumet Ave, Calumet, Mich

VP & Gen Mgr: A S Kromer

**EXPLORATION OFFICE**, Box 706, Grants

SE, Albuquerque

Party Chief: R W Kleinenstein

Geol: T A Boden

URANIUM DIV, Box 906, Grants

Branch Mgr: George McKereghan

Office Mgr: J H Doyle

Geol: R W Wege

**MARQUEZ MINE**, Ambrosia Lake,

undergr., U.S.Q.

Under devel

(See Ill, Mich, N.Y.)

**CAPITOL-SEABORD CORP**

Box 1847, Farmington

Gen Mgr: Charles W Yetter

**JETER (CHARLIE #2) MINE**, Ladron

Min, Socorro County, U.S.Q., V.Z.Q.

Prod: 50 tons

(Leased to Uroton Corp, Belen)

(See Ariz, Idaho, Mont, Texas, Utah)

**DALCO URANIUM, INC**

Uranium Center Bldg, Grand Junc-

tion, Colo

Gen Mgr: E E Lewis

**DALCO NO 1 MINE**, Grants, undergr.,

U.S.Q.

Prod: 100 tons

(Leased from Mid-Continent Uranium

Corp, Grand Junction, Colo)

**DENNIS & FIFE**

Cameron

Pres: Lloyd T Dennis

**GOOD LUCK MINE**, Cameron, undergr.,

U.S.Q., Cu

Prod: 10 tons

Under devel

**DUVAL SULPHUR & POTASH**

Co, Potash Div

Box 510, Carlsbad

Res Mgr: J E Tong

Asst Res Mgr: J W Borskey

Ch Eng: B F McGuire

Safety Eng: C E Childers

Purch Agt: J R Smith

MINE, 21 mi NE of Carlsbad, undergr.,

potash

Prod: 3,000 tons

Mine Supt: R H Taylor

Min Frm: J J Gasparich

Min Eng: H L Shively

**FLOT MILL**

Mill Supt: D J Bourne

Min Frm: M H Harrison

(See Ariz, Tex)

**ELAYER CO, INC**

Box 1058, Silver City

Pres & Gen Mgr: C E Clayer

Linchburg MINE, Socorro County,

Pa, Ag, Zn

**FARM CHEMICAL RESOURCES**

DEVEL CORP

602 W Greene St, P.O. Box 870,

Carlsbad

Pres & Gen Mgr: E F Kindvater

VP: C J Talbot, D A McGee

Sec: C F Branson

Treas: L A Woodward

Purch Agt: W H Hensley (Acting)

Chmn of Bd: J G Paxton

**POTASH MINE**, Eddy & Les Counties

near Artesia

Under devel

(Joint venture of Kerr-McGee, Phillips

Petroleum Co and Nat'l Farmers Union)

**FOUR CORNERS EXPLOR CO**

Box 116, Grants

Gen Mgr: Irving Rapaport

Asst Gen Mgr: Forrest Fincher

Mng Eng: Robert Kirchman

Off Mgr: Clayton Langlais

**PROPERTIES**, Grants, Ambrosia

Lake, U.S.Q.

Mine Supt: Roscoe Riddle

Prod: 40 tons

**DOG MINE**, McKinley County, U.S.Q.

(See Col)

**GREAT LAKES CARBON CORP**

Box X, Socorro

Pres: Geo Skakel, Jr

VP, Perlite Div: D L Martlett

**BLANCA VISTA MINE**, 4 mi W of

Socorro, surface, perlite

Supt: Jerry Howell

Ch Geol: J W Reinhart

**MILL**, Socorro

(See Calif, Colo, Nev, N.Y., Oreg)

**HAYSTACK MT DEVEL CO**,  
(A SUBSID OF SANTA FE RY

CO)

80 E Jackson Blvd, Chicago 4, Ill

Pres: F G Gurley

VP: R G Rydin

Sec-Treas: C A Menninger

Purch Agt: F J Steinberger

**HAYSTACK & POISON CANYON**

MINES, Prewitt, open pit, U.S.Q.,

V.Z.Q.

Ch Mng Eng: T O Evans

Sen Mng Eng: C E Stauder, Jr

Prod: 400 tons

**SECTION 23-13-10 SECTION 23-13-19**

MINES, McKinley County, U.S.Q.

(See Ariz, Tex)

**HOLLY MINERALS CORP**

340 Third St NW, Albuquerque

Pres: A H McRae

VP & Gen Mgr: J G Heaston

**BEACON HILL MINE**, 322 W Santa Fe,

Grants, undergr., U.S.Q.

Supt: W A Palmer

Idle

**BUCKY #1 MINE**, Grants, U.S.Q.

**FLAT TOP MINE**, Grants, U.S.Q.

Idle

**MESA TOP MINE**, Grants, U.S.Q.

(See Idaho, N.Y.)

**HOMESTAKE-NEW MEXICO**

PARTNERS

P.O. Box 98, Grants

(Gen Part: Homestake Mng Co

Limited Partners: United Western

## New Mexico

Minerals Co; J H Whitney & Co;  
White, Weld & Co; Rio de Oro  
Uranium Mines Inc; San Jacinto  
Petroleum Co; Clyde Osborn)

Box 98, Grants  
SECTION 32 MINE, Ambrosia Lake,  
U<sub>3</sub>O<sub>8</sub>

Gen Mgr: Langen W Swent

Geol: Theo Rizzi

Mech Eng: Roger Madson

Mkt: Clyde Osborn

Mine Supt: Richard J Stoehr

750-TON CARBONATE LEACH PLANT,  
6 mi NW of Grants

Supt: Clyde Garman

Asst Supt: Homer Derrer

Sampling Plant & Yard Fm: Wm V Story

Mill Fm: Rob W Strammer

Plant Mgr: Fred N Oberg

Ch Chem: John R Wesley

Control Eng: Harvey O Bird

Elec Fm: B W Brown

Mech Eng: Royce M Bricker

Shift Boss: Harry R Kroen, Alex  
Carriere

**HOMESTAKE-SAPIN PARTNERS**  
(Gen Part: Homestake Min Co; Limited  
Part: Sabre-Pinon Corp)

Box 98, Grants

SECTION 15, 23 & 25 MINES, Ambrosia

Lake, undergr, U<sub>3</sub>O<sub>8</sub>

Gen Mgr: Langen W Swent

Geol: Theo Rizzi

Mech Eng: Roger Madson

Mkt: Eugene Allen

Mine Supt: Donald T Delicate

1,500-TON CARBONATE LEACH PLANT,  
8 mi NW of Grants

Under const

**INTERNAT'L MINERALS &**  
**CHEM CORP., POTASH DIV**  
20 N Wacker Dr, Chicago, IL 60601

Pres: Louis Ware

Adm VP: T M Ware

VP, Potash Div: N C White

Sec: C Edwards

Treas: R A Lomon

Gen Mgr: C A Arend, Jr

CARLSBAD POTASH MINE, Box 71,

Carlsbad, undergr, KCl & K<sub>2</sub>SO<sub>4</sub>

Res Mgr: E C Skinner

Gen Supt: G E Pressnell

Geol: R Houghland

Mech Eng: L H Bunnel

Mkt: W B Dancy

Elec Eng: J Hyatt

Mine Supt: M W Kartchner

Mine Fm: W F Eckland

Mech Eng: Adolph Mitterer

Prod: 13,000 tons

13,000-TON FLOT MILL, at mine

Mill Fm: Dean Owen

Mill Supt: R M O'Flyng

(See Ariz, Colo, Fla, Ill, Me, Miss, NC,  
Ohio, SD, Tenn, Va, Wyo)

**KENNEDOTT COPPER CORP**

**CHINO MINES DIV**

Hurley

Gen Mgr: W H Goodrich

Asst Gen Mgrs: E A Slover  
J K Richardson

Dir Purch Agt: C N Dempsey

CHINO MINES, Santa Rita, open pit

& undergr, Cu, Mo

Mine Supt: G J Ballmer

Asst Supt: W E Herkenhoff

Mine Fm: K V N Harris

Mine Eng: H A Wilmeth

Undergr oper idle

FLOT MILL, Hurley

Mill Supt: E A Schroefer

Asst Mill Supt: F D Thayer

Mill Fm: B C Jacobs

REVERB SMELTER, Hurley

Supt: W H Winn

Asst Supt: W C Dow

(See Ariz, Nev, N Y, Utah)

**KERMAC NUCLEAR FUELS**

**CORP**

(Owned by Kerr-McGee Oil Industries,  
Inc; Pacific Uranium Mines Corp,  
Los Angeles, Calif; Anderson Develop-  
ment Co, Albuquerque, N Mex)

P O Box 218, Grants

MINES, Grants, undergr, U<sub>3</sub>O<sub>8</sub>

Under devel

MILL (Proposed)

**KERR-MCGEE OIL INDUS,**

**INC, NAVAJO URANIUM DIV**

P O Box 608, Shiprock

VP: A T F Seal

Mgr of Mng & Mfg: V L Mattson

Mine Supt: Jack Landon

COVE MINES, undergr, U<sub>3</sub>O<sub>8</sub>

Prod Fm: Vernon Willden

Mgr Mng & Mfg: M F Bolton

Mine Shift Bosses: Blaine Byers

W Edmonson

Mine Eng: Billy Stevens  
Prod: 100 tons plus  
MILL, Shiprock  
Mill Supt: Floyd Jackson, Glenn  
Nofinger, Al Cyrova,  
Leo Carlton  
(See Ariz, Colo, Okla, Wyo, and  
Kermac Nuclear Fuels, Colo, N Mex)

**LARGO URANIUM CORP**  
(Subsidy of FOUR CORNERS URANIUM  
CORP, Denver, Colo)  
220 Mile High Center, Denver, Colo  
Pres: E H Sanders  
VP: Ed L Clark  
Gen Supt: Wesley Smith  
DIAMOND NO 3 MINE, 815 E Morgan,  
Galisteo, undergr, U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Geol: William D Tipton  
Prod: 45 tons

**LEACH & LEACH**  
P O Box 11, Lordsburg  
Gen Mgr: Francis J Leach  
Geol: Albert A Leach  
LADY FRANKLIN GROUP, Ag, Au, Ma  
COLLOSSAL-MIDNIGHT, Cu, Ag, Ag  
RESERVATION-MINNEAPOLIS, Au,  
Ag, Pb  
ALHAMBRA GROUP, U<sub>3</sub>O<sub>8</sub>, Ag, Ni, Co  
ALASKA GROUP, GOLDEN LINK  
GROUP, MALONE GROUP, Ag, Ag  
Producing  
FLOYD COLLINS GROUP, White Signal  
dist, Grant County, U<sub>3</sub>O<sub>8</sub>

**LISBON URANIUM CORP**  
304 First Security Bldg, Salt Lake  
City, Utah  
**SAN MATEO HOME PROPERTIES**,  
Ambrosia Lake Area, U<sub>3</sub>O<sub>8</sub>  
Devel Drilling Program under  
direction of E J Longyear Co  
(See Mont, Colo, Wyo, Wyo)

**LONE STAR MNG & DEVEL**  
CORP

235 Korber Bldg, Albuquerque  
Pres: W L Davidson  
Sec-Treas: W C Oestreich  
LA BAJADA MINE, Santa Fe Canyon,  
48 mi NE of Albuquerque, 17 mi SW  
of Santa Fe, undergr, U<sub>3</sub>O<sub>8</sub>, Cu, Ni,  
Co  
Mine Supt: C A Bowerman  
Prod: 40 tons  
Elce Utah

**LOST CANYON URANIUM &**  
**OIL CO**  
224 First Nat'l Bank Bldg, Albuquerque  
LOUISE & KATHRYN MINES, undergr  
Under devel

**LUCK MNG & CONSTR CO**  
Box 29, Silver City

Own & Gen Mgr: G K Luck  
BOSTON HILL MINE, Grant County,  
surface, Mn

**MAGDALENA MNG & MLG CO**  
1260 Simms St, Lakewood, Colo  
MAGDALENA MINE, P O Box 236,  
Magdalena, 17 mi S of Magdalena, Mn  
Gen Mgr: R M Conrad  
Under devel  
(See Colo)

**MATHIS & MATHIS**  
P O Box 452, Silver City  
IRON HEAD CLAIM & PEARSON PIT,  
near Pierro, Fe

**MC FARLAND & HULLINGER**  
Silver City  
**CONTINENTAL "B" MINE**, Grant  
County

Supt: R H Ashlock  
(See Ariz, Colo, Utah)

**MEX-TEX MNG CO, INC**  
Box 501, Socorro  
Pres: J E Bishop  
Gen Mgr: Ben B Scott  
**ROYAL FLUSH & SNAKE PIT MINES**,  
Socorro County, undergr, Ag, Pb,  
BaSO<sub>4</sub>, CaF<sub>2</sub>  
Mine Supt: Maynard Byrd  
Prod: 150 tons  
Under devel  
500-TON GRAV MILL  
Mill Supt: Frances Williams

**MID-CONTINENT URANIUM**  
CORP

O P Box 57, Grants  
BARBARA J NO 1 MINE, 12 mi NW  
of Grants, McKinley County, undergr,  
U<sub>3</sub>O<sub>8</sub>  
Gen Mgr: Norman E Ebbiley  
Gen Supt: Joseph F James

Geol: Coy M Mohley  
Prod: 60 tons  
**DALCO NO 1 MINE**, Grants, undergr,  
U<sub>3</sub>O<sub>8</sub>  
(leased to Dalco Uranium, Inc, Grand  
Junction, Colo)  
(See Colo, Utah)

**MINERALS ENGR CO,**  
**PETACA DIV**

Box 4285, Santa Fe  
**PETACA MINE**, 64 mi N of Santa Fe,  
open pit, mica  
Gen Supt: R H Beck  
Purch Agt: J S Walker  
Prod: 250 tons  
**CAPITAN MINE**, Rio Arriba County,  
columbite, tantalum, monazite  
MILL, at mine  
Mill Supt: John DeVane  
Mill Fm: Leo J Trujillo  
(See Colo, Mont)

**MOLYBDENUM CORP OF**  
**AMERICA**  
Questa

Pres: Marc Hirsch  
VP: E A Lucas  
Treas: Wm B Kuntz  
Gen Mgr: A L Grelin  
**MOLY MINE**, 7 mi E of Questa,  
undergr, Mo  
Supt: Jose Varela  
Under devel

**EMI-TON FLOT MILL**  
Supt: Robert Creel  
Elce

(See Calif, Colo, NY, Pa)

**NATIONAL POTASH CO**  
205 E 42nd St, New York, NY

Pres & Treas: R C Wello  
VP & Gen Mgr: T G Ferguson  
VP: W B Peterfield  
Sec: H L Pearson  
Purch Agt: J A Brownell  
MINE, Carlsbad, undergr, potash  
Mine Supt: R W Jenkins  
4,800-TON FLOT MILL, Carlsbad  
Mill Supt: G L Jordan  
(See NY)

**NEW JERSEY ZINC CO, THE**  
160 Front St, New York, NY

VP, Mng & Explor: S S Goodwin  
Sec: Walter R Ayres

**EMPIRE ZINC DIV**  
Western Mgr of Mines: P J Maloit  
Gilman, Colo  
HANOVER MINE, undergr, surface,  
Zn, Pb, Hanover

Asst Supt: C C Snell  
Idle

**800-TON FLOT MILL**

(See Colo, Ill, N J, N Y, Pa, Tenn, Va,  
Wisc)

**OZARK-MAHONING CO, MNG**  
DIV

310 West Sixth St, Tulsa 10, Okla  
MINES, Cu, Zn  
(See Colo, Ill, Okla)

**PACIFIC URANIUM MINES INC**  
1024 White, Grand Junction, Colo

Pres: B Silbert  
Sec-Treas: I Klubok  
**SECTION 24 & 26 MINES**, Ambrosia  
Lake dist, U<sub>3</sub>O<sub>8</sub>  
Ch Geol: R L Redmond  
Geol: J H Volgemoer, Jr  
Prod: 1,000 tons  
(Managed by Kermac Nuclear Corp,  
Grants)

Ues Coal

**PATTER & GALASSINI**

Box 296, Bayard  
Part: L A Patter, Gene Galassini  
**BULLFROG MINE**, Grant County, Pb,  
Zn  
**CONTINENTAL "A" MINE**, Grant  
County

**PERU MNG CO**

Box 300, Silver City  
Pres: Morris Blumberg  
VP: J H Taylor  
Sec: J S Flory, Jr  
**KEARNEY MINE**, Ag, Pb, Zn  
Gen Mgr: W T Dowd, L J Conley  
**PEWABIC MINE**, Ag, Pb, Zn  
PERU MILL, at mine  
Mill Supt: S T Mcbee

**PHELPS DODGE CORP**

Tyrone  
**HURRICANE MT BRANCH**  
Ag: John F Stock, Jr  
Explor  
**COPPER & RACKET MINE**, Grant  
County, Co  
(See Ariz, N Y, Tex)

**PHILLIPS PETROLEUM CO**

Grants  
**PHILLIPS #1 MINE**, McKinley County,  
U<sub>3</sub>O<sub>8</sub>  
1,750-TON U<sub>3</sub>O<sub>8</sub> MILL, Ambrosia Lake,  
McKinley County  
Supt of Mines: R W Jenkins  
Gen Supt & Mill Supt: A A Rucho  
Mng Eng: Roger Caywood  
Geol: Richard Pascoe  
Asst Supt of Admin: G E Karr  
Dist Geol: George Brasheer, Albuquerque;  
quar: Dean Clark, Grants;  
Fredrick Stugard, Gallup  
(See Okla, Utah)

**POTASIO CO OF AMERICA**

Box 21, Carlsbad  
Pres: G F Coope  
VP & Treas: P O Davis  
VP & Rel Mgr: R G Haworth  
Purch Agt: A H Beidel  
Ind Rel Supt: R H Blackman, Jr  
Gen Supt: H N Clark  
Cont: W H Barlett  
MINE, 21 mi NE of Carlsbad,  
undergr, potassium chloride  
Plant Eng: R G Dahney  
Safety Eng: R G Billings  
Mine Supt: R R Knill  
Mine Fm: Neil Juholia  
Mine Eng: E C Jourdan  
Prod: 8,000 tons  
8,000-TON FLOT MILL, at mine  
Mill Supt: R E Smith  
Asst Mill Supt: E M Dale

**RARE METALS CORP OF AMER**  
Int Security Bldg, Salt Lake City II,  
Utah

Pres: C L Perkins  
VP & Asst Gen Mgr: M H Kline  
Sec-Treas: Virgil Rittmann  
MINE, Ambrosia Lake dist, U<sub>3</sub>O<sub>8</sub>  
Under devel  
(See Ariz, Calif, Idaho, Utah)

**REM URANIUM CO**

702 S 3rd St, Gallup  
Pres & Gen Mgr: R J Scanlon  
VP: W B Colbert  
Sec: John H Mandus  
Elce Coal

**RIO DE ORO URANIUM MINES**  
INC

215 Fourth St, SW, Albuquerque  
Pres: W Rodney De Villiers  
VP: G R Kennedy  
Sec: R F Deacon Aridge  
Treas: F A Fuller  
Purch Agt: Ray Reynolds  
DYSART NO 1 MINE, Ambrosia  
Lake, undergr, U<sub>3</sub>O<sub>8</sub>  
Gen Supt: Ray Schultz  
Geol: Harold A Powers  
Met: Clyde Osborn  
Prod: 800 tons

IKE NO 1, Ambrosia Lake, undergr,  
U<sub>3</sub>O<sub>8</sub>  
MILL (See Homestake - N Mex  
Partners)

**SABRE-PINON CORP**

103 Bolook Bldg, Santa Fe  
Pres: Richard D Bolook  
VP: W R Montgomery  
Sec: George Slover, Jr  
Treas: Hugh M Craigie  
AMBROSIA LAKE MINE, Ambrosia  
Lake, McKinley County, U<sub>3</sub>O<sub>8</sub>  
(Under devel as Homestake-Sabre  
Partners)

**PROPERTIES**, Ambrosia Lake dist,  
& Mesa Grande, Sandoval, &  
Bernalillo Counties

Explor

(See Colo)

**CARBONATE LEACH PLANT**

(Proposed)  
(See Homestake-Sabre-Pinon Part)

**SAN CARLOS URANIUM CO INC**

P O Box 507, Las Vegas  
Pres: Charles Lujan  
VP: Tony Gutierrez  
Sec-Treas: Chas Lujan, Jr  
WINDY NINE MINE, Sabino, San  
Miguel County, open pit, U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Geol & Mine Supt: John Haberl  
Prod: 30 tons  
Under devel

**ST ANTHONY URANIUM CORP**

Box 1790, Grand Junction, Colo  
Gen Mgr: A M Mastrovich  
M-6 SHAFT, Valencia County, undergr,  
U<sub>3</sub>O<sub>8</sub>  
Gen Supt: Edward Matson  
(See Colo, Kennecott Corp, NY)

**SHIPROCK INDUSTRIES, INC.**

729 East Main, Farmington  
Pres: F T Anderson  
VP: Neil W Stahlheim  
Sec-Treas: W G Clinchy  
MINE, Farmington, Sanassee dist., undergr., U<sub>3</sub>O<sub>8</sub>  
(See Colo)

**SOUTHWEST POTASH CORP**  
(Subsidiary of AMERICAN METAL CLIMAX, INC.)

61 Broadway, New York 6, N.Y.  
MINE, Box 473, Caribbean, 22 mi  
NE of Caribbean, undergr., potash  
Gen Mgr: Victor A Zandman  
Plant Eng: Dale L Schrader  
Purch Agt: A H Kunkel  
Mine Supt: John Sowers  
Mine Eng: Eric Herbert  
Prod: 4,000 tons  
4,000-TON PLOT MILL, at mine  
Mill Supt: J Frank Henderson  
Asst Mill Supt: George Marts  
Ch Chem: H S Kaplan  
(See American Metal Climax Co., Ltd., N.Y.)

**STAR MINES**

602 W 12th St., Silver City  
Pres & Gen Mgr: David D Omer  
MORNING STAR MINE, undergr.,  
placer, WO<sub>3</sub>, Bi  
Mine Supt: Louis L Omer, Jr  
Prod: 10 tons

**24-TON GRAV MILL**, at mine**THOMPSON, WARREN BARRY**  
P.O. Box 1827, Denver, Colo  
AJAX & LITTLE WONDER MINES,  
Colfax County, undergr., Au, WO<sub>3</sub>  
(See Colo, Utah)**U.S. BORAX & CHEMICAL CORP., B & S POTASH CO DIV**  
Carlsbad

Res Mgr: Earl H Miller  
Asst to Res Mgr: D L Libbey  
Purch Agt: R D Schenck  
MINE & REFINERY, 31 mi E of  
Carlsbad, potash  
Mine Supt: John S Wright  
Refinery Supt: George R Bowland  
(See Calif, Ariz, Mass, Utah)

**U.S. SMELTING REFINING & MINING CO**

P.O. Box 698, Bayard  
MINE, Pb, Zn  
Supt: G E Cudney  
PLOT MILL  
Gen Mill Frm: Gordon T Glover  
(See Alaska, Ariz, Mass, Utah)

**UNITED WESTERN MINERALS CO**

136 W Palace Ave, Santa Fe  
Pres: Alva A Simpson, Jr  
Asst to Pres: E B White, Jr  
VP: Norman S Duke  
Sec-Counsel: Herbert A Holt  
Treas: Peter Cable  
SEC 33, T-14N, R-9W, Ambrosia  
Lake, undergr., U<sub>3</sub>O<sub>8</sub>  
Geo: J W Patterson  
Prod: 400 tons daily (last quarter 1957)  
(This section owned by Homestake-New Mexico Partners)

SEC 36, T-14N, R-10W, Ambrosia  
Lake, undergr., U<sub>3</sub>O<sub>8</sub>  
Op: Vanadium Corp of America  
Prod: 100 tons daily (last quarter 1957)  
(This section jointly owned by United Western Minerals; J H Whitney & Co; White Weld & Co, San Jacinto Petrol Corp)

SEC 33, T-14N, R-10W, Ambrosia  
Lake, undergr., U<sub>3</sub>O<sub>8</sub>  
Op: Kerr-McGee Oil Industries Inc., Kermac Nuclear Fuels  
Prod: 500 tons daily (first quarter 1958)  
(This section jointly owned by Kerr-McGee Oil Indust, United Western Minerals Co; J H Whitney & Co; White Weld & Co; San Jacinto Petroleum Corp)

750 TON CARBONATE LEACH PLANT, near Grants (under const) by Homestake-New Mexico Partners; completion date Feb 1958  
Gen Supt: Clyde Osborn

**UTCO URANIUM CORP**

Suite 227, Guaranty bank bldg., Denver 2, Colo  
Pres: Geo S Casey  
VP & Gen Mgr: Mason W Rankin  
Sec: Harold Clark Thompson  
Treas: J D Vander Phoe

CHARLIE #2 (JETER) MINE, Box 253, Boon, undergr., U<sub>3</sub>O<sub>8</sub>

Gen Supt: Donald W Wright  
Geo: Charles Evensen  
Mine Supt: Bill Wright  
Mine Frm: Keith Goodell

Prod: 40 tons  
(Leased from Capitol-Seaboard Co)  
HATTIE #2 MINE, Socorro County, Mo

**VANADIUM CORP OF AMER**

430 Lexington Ave, New York, N.Y.  
Pres: W C Keeley  
VP: D W Viles  
Sec: D A Shriver  
Treas: L C Miller  
Purch Agt: F W Thomas  
SEC 36 MINES, McKinley County,  
U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Mine Frm: Abe Day  
(See Ariz, Colo, N.Y., Utah)

**VERMONT CLIFFS MNG CORP**

Box 1627, Flagstaff, Ariz  
Pres: C E Knowles  
VP: R E Darling  
Sec-Treas & VP of Oper: Alles C Testar  
SLATE, SILVER KING & RED GRANDE  
MINES, Bayard Dist, N Mex, undergr.,  
Pt, Zn  
Mine & Gen Supt: Ray Holmquist  
Mine Frm: Urbano Chacon  
Mds  
(See Ariz)

**VOGEL URANIUM MINE & EXPLOR CO**

Box 3183, Amarillo, Texas  
Gen Mgr: Harold V Vogel  
MIKIE V NO. 2, 6, 7 MINES, San  
Miguel County, open pit, Tocito  
Mng dist, U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>, Cu  
Asst Gen Mgr: Harold H Ham  
Under devl  
(See Colo)

**WERNER LAKE NICKEL MINES LTD**

311-209 Bay St, Toronto, Ont, Canada  
Pres: R C Henson  
VP: G D Clarke  
Sec-Treas: G E Kennedy  
HENRY CLAY MINE, P.O. Box 546,  
Lordsburg, Cu, As, Ag  
Gen Mgr: Murray Watts  
Geol: A Mahalek  
Under devel

**WESTVACO MINERAL PRODUCTS DIV**

(FOOD MACHINERY & CHEM CORP)  
Star Route Box 24, Grants  
PAITI MINE, Grants, Ambrosia Lake  
Dist  
Geo: R J Hayden  
Mine Supt: R C Kirchman  
Asst Mine Supt: Jack W Spencer  
Under devel

**WESTWATER CORP**

103 Bulum Dug, Santa Fe  
Pres: J E Brosema  
VP: C C Green, Jr  
Sec: W L Leeds  
Treas: Peter Ortiz Y Pino  
WESTWATER #1 MINE, Sec 3 T 15N  
R 18W, McKinley County  
Mine Supt: James H Mallory  
Under devel

**ZUNIGA MINES, INC**

Box 501, Silver City  
Pres: Douglas B White  
VP: Earl Strong  
Sec-Treas: Frank Light  
ZUNIGA MINE, near Pierro, Grant  
County, surface, Cu  
Prod: 100 tons  
LEACHING MILL, at mine

**NEW YORK****ALLIED CHEM & DYE CORP.**

GEN CHEM DIV  
40 Hector St, New York 6  
VP: I H Foothes  
Mgr: R H Dickson  
Asst Mgr: Ming Oper: W J Trepp  
Dir, Purchases: F J French

**AMER AGRI CHEM CO, THE**

50 Church St, New York 7  
Pres: C M Powell  
VP: B R Richey  
Sec & Treas: Hughes Mayo  
Purch Agt: G E Campbell  
(See Fla)

**AMERICAN CYANAMID CO**

30 Rockefeller Plaza, New York  
Pres: K C Towne  
VP: R B Fiske, Ed Powers, W G  
Malcolm, R C Swain, G R Martin,

S C Moody, L C Perkins  
Treas: G C Walker  
Sec: R S Kyle  
(See Ark, Fla, Ga, Va)

**AMERICAN METAL CLIMAX, INC**

61 Broadway, New York 6  
Chmn of Bd: Arthur H Bunker  
Pres: Hans A Vogelstein  
VP: T W Childs, H S Cohen, Frank  
Goolbaugh, H de Neville,  
A J Herrig, G V Land, Ian K  
MacGregor, J Payne, Jr, E T  
Rose, W G Thomas, Jean  
Vulliaume, R E Warrier  
Sec: Erwin A Well  
Treas: Donald J Donahue  
(See Pa, Climax Molybdenum Div,  
Colo, Pa; U S Metals Ref Co in Mich,  
N J & Southwest Potash Corp in N Mex,  
& N.Y.)

**AMERICAN MACH & METALS, TROUT MNG DIV**

233 Broadway, New York 7  
Chmn of Bd: John C Vande Pyl  
Pres: Charles W Anderson  
VP: I Newton Becker, John S  
Swennemann, Ambrose E LeVan  
Comptroller: Glenn A Swennemann  
Sec: Alphonse Kenison  
Asst Sec: Roy F Stachek, Henry C Doofe  
Treas: Robert G Burns  
Asst Treas: Harry C Anderson, Albert  
L Ewing  
Asst Sec & Treas: Patricia A  
Harrington, William H Behrens  
Purch Agt: Roy McLeod  
(See Mont)

**AMERICAN SMELTING & REFINING CO**

120 Broadway, New York  
Chmn of Bd: Kenneth C Brownell  
Pres: R W Vaughan  
Chmn of Fin Com: P O Strauss  
VP: R D Bradford, A S Brown, F H  
Eichler, J D MacKenzie, A J  
Phillips, S D Strauss, F Walker  
Treas: F H Hamrick  
Sec: Harold Howe  
Mgr, Ore Purch Dept: R L Jourdan  
MINING DEPT

Asst to VP: D J Pepe  
Res Engs: V J Mann, C E Nelson  
Engr Mgr: C P Pollock  
Ch Geol: L H Hart  
PURCHASING DEPT  
Dir: F H Eichler  
TRAFFIC DEPT  
Gen Tr Mgr: F L Mervin  
(See Ariz, Calif, Colo, Idaho, Ill,  
Kans, Md, Mont, Neb, N.J., N Mex,  
Tex, Utah, Wash & Federal Mng &  
Smelting Co, Mo)

**ANACONDA ALUMINUM CO**

25 Broadway, New York  
Pres: R B Caples  
VP: C H Steele  
Sec-Treas: C E Moran  
Purch Agt: A B Harris  
(See Montana)

**ANACONDA CO, THE**

25 Broadway, New York  
Chmn of Bd: Roy H Glover  
Pres: Clyde E Wood  
Exec VP: Edward S McGlone  
VP, Min Oper: Richard S Newlin  
VP, Met Oper: Russell B Caples  
VP, Western Oper: Chester H Steele  
VP & Comptroller: W Kenneth Daly  
VP Latin-American Affairs:  
Thomas A Campbell

Sec & Treas: C Earle Moran  
Asst Sec: Jeremiah D Murphy  
Asst Sec & Asst Treas: David R Nelson,  
Ralph E Schneider, Ed Mayo,  
Jos J Cinaglia  
Asst Comptroller: William E Quigley  
VP & Ch Geol: V D Perry  
Gen Counsel: C Jay Parkinson  
(See Calif, Idaho, Mont, Nev, N Mex,  
Utah)

**BARTON MINES CORP**

N Creek, New York  
Pres: H H Barton  
VP & Mgr: H H Vogel  
Sec & Prod Mgr: C R Barton, Jr  
Gen Frm: Howard Waldron  
Purch Mgr: T Leonard, Jr  
Cont: J B Burns  
Met: William Elting  
MINE, near North Creek, open pit,  
garnet  
Mine Frm: G Brown  
Prod: 400 tons  
400-TON GRAV-PLOT-HEAV-MED  
MILL, at mine

**BEAR CREEK MNG CO**

161 42nd St, New York 17  
(See Utah, Wash, & Kennecott Copper  
Corp, N.Y.)

**BUTTE COPPER & ZINC CO**

25 Grand St, New York 4  
Pres: A A Shelare  
VP & Treas: Miles MacDonald  
Sec: John F Cole  
(See Mont)

**CALLAHAN ZINC-LEAD CO**

100 Park Ave, New York 17  
Pres: T J Hall  
VP: R F Mahoney, P D Wilson  
Sec-Treas: E A Salo  
(Property transferred to Pinnacle Expl,  
Inc, Colo)

**CALUMET & HECLA, INC**

60 E 42nd St, New York  
Pres: E R Lovell  
Exec VP: H Y Bassett  
VP & Gen Mgr: A S Kramer  
(See Ill, Mich, N Mex)

**CAMP BIRD LTD**

70 Pine St, New York 5  
Chmn: John Dagleish  
Cons Eng: C Maxwell Norman  
Sec: Ian Whyte  
(See Colo)

**CLIMAX URANIUM CO**

Subsidiary of AMERICAN METAL CLIMAX  
INC  
500 Fifth Ave, New York 36  
Sec: L A Cowan  
Treas: W Macgregor  
(See Ariz, Colo, Utah)

**CLINTON MET PAINT CO**

Clinton  
Pres & Treas: Bruce M Bare  
Sec & Purch Agt: Mrs C K Cossell  
MINE NO 3, Clinton, undergr, iron  
oxide  
Gen Supt: Robert Barry  
40-TON MILL, Franklin Spr  
Mill Supt: Ray Chryster  
(See Nev)

**CONSOL COPPERMINES CORP**

405 Lexington Ave, New York 17  
Pres: Chester D Tripp  
VP: Claude F Leaman  
VP & Treas: Charles L Steeger  
Sec: E J A Tenbrink  
(See Nev)

**COPPER CITIES DIV**

MIAMI COPPER CO  
61 Broadway, New York  
Pres: E H Westlake  
VP: J H Follott  
VP & Treas: J H Greenburgh  
Sec: Henry Kaufman  
Purch Agt: R L Beale  
(See Ariz & Miami Copper Co, Ariz & N.Y.)

**CYPRUS MINES CORP**

485 Lexington Ave, New York  
Pres: H T Mudd  
VP: A R Thomas  
VP & Treas: W S Nye  
Sec: L A Garrett  
Purch Agt: W F Stover  
(See Ariz, Calif, Colo)

**FREEPOR SULPHUR CO**

161 E 42nd St, New York 17  
Pres: Langbourne M Williams  
Chmn Exec Comm: C A Wright  
Exec VP: R C Hills, H L Pierce  
(See La, N Mex & Nat'l Potash Co, NY)

**GOLDFIELD AMERICAN DEVELOPMENT, LTD**

123 Williams St, New York 38  
GOVERNOR TALC CO, INC  
c/o R T Vanderbilt Co, 200 Park  
Ave, New York 17

Pres: F B Vanderbilt  
Sec: H B Vanderbilt  
Treas: F C Gens  
Purch Agt: K J Miles  
VANDERBILT MINE, Balmat, undergr,  
lode  
VP & Gen Mgr: R S McClellan  
Mine Supt: J Bulgar  
Fr: Leon Typhair  
Mine Eng: Geo Erdman  
Prod: 350 tons

**500-TON DRY GRIND PLANT**

Mill Supt: Howard Adam  
GREAT LAKES CARBON CORP  
18 E 48th St, New York  
Pres: George Skakel, Jr  
VP & Gen Mgr: D L Marlow  
Oper Mgr: E A Harris  
Asst Oper Mgr: N V Brower  
Purch Agt: Jay Hughes  
(See Calif, Colo, Nev, N Mex, Okla)

## New York

**HAILE MINES, INC.**  
500 Fifth Ave., New York 36  
Pres: W M Weaver, Jr.  
Chairman of Bd: W Lumford Long  
VP: Hewitt S West, Jr., Frederick  
McGonigle  
VP & Sec: Charles R Skinner  
Treas: Joseph F Wilmoth  
(See N Mex)

**HOLLY MINERALS CORP**  
Chrysler Bldg., New York 17  
Pres: A H McRae  
VP: J G Heaston  
(See N Mex, Idaho)

**IDAHO ALTA MINERALS CORP**  
270 Madison Ave., New York 16  
(See Idaho)

**INSPIRATION CONSOL  
COPPER CO**  
25 Broadway, New York 4  
Pres: R S Newlin  
VP & Gen Mgr: P D Honeyman  
VP & Sec: H M Jacob  
Treas & Ass't Sec: E F Wendt  
Purch Agt: A B Harris  
(See Ariz)

**INTERNAT'L SALT CO., INC**  
Reinaird  
RETFOOT MINE, 4 mi S of Genesee  
undergr., rock salt  
Gen Mgr: T F Courtshore  
Purch Agt: J A Cooney  
Pl Mgr: S Martin  
Pl Eng: R Goets  
Elec Eng: D L Moynes  
Prod Supl: J J Riordan  
Mine Supt: Lawrence Teter  
Ass't Mine Supt: Lewis Bush  
Mine Eng: Chester Truax, Jr  
Prod: 4,000 tons  
(See Pa)

**INTERNAT'L TALC CO., INC**  
Box 286, Gouverneur  
Gen Mgr: Frederick Kuehl  
MINE, talc  
Supl of Mines: David J Crawford

**JOHNS-MANVILLE SALES  
CORP**  
22 E 40th St., New York 16  
Chairman of Bd: L Cassidy  
Pres: A R Fisher  
VP: K W Huffine  
Sec: H M Ball  
Treas: R Hackney  
Purch Agt: D H Lyons  
(See Johns-Manville Products Corp., Calif)

**JONES & LAUGHLIN STEEL  
CORP., NEW YORK ORE DIV**  
Star Lake  
BENSON MINES, 32 mi E of  
Gouverneur, open pit, Fe  
Mgr: R G Fleck  
Ass't Mgr: A F Peterson, Jr &  
M O Peterson  
Ch Min Eng: E M Smelby  
Pl Met: E A Eastman  
Res Eng: Carl Djurik  
Ch Acct: A R Eshbach  
Geol: F J West  
Ind Eng: F E Woodworth, Jr  
Gen Firm, Plt: W P Bach  
Gen Firm, Conn: W A Vickers  
Gen Firm, Sinter: R W West  
Gen Firm, Maint: P A VerSteeg  
Ch Elec: R F Peterson  
Safety Supl: C LaDuke  
Prod: 15,000 tons crude  
5,000 tons concentrate  
**GRAV & MAGNETIC SEPARATOR  
MILL**, at mine  
**SINTER PLANT**, at mine  
(See Mich, Minn, Pa)

**KENNECOTT COPPER CORP**  
161 E 42nd St., New York 17  
Pres: C R Cox  
VP, Explor: James Boyd (Bear Creek  
Mng Co)  
VP, Research: Leslie G Jenness  
VP: Frank R Milliken  
Sec: Paul B Jesup  
Treas: E S Hann  
Compt: G B Russell  
Dir, Eng: F W Chambers  
Dir, Ind & Pub Rel: A S Cherouky  
Counsel: S S Jackson  
Gen Purch Agt: L W Shelton  
Gen Traff Mgr: R E Taylor  
(See Ariz, Nev, N Mex, Utah and  
subsidiaries, Bear Creek Mng Co,  
NY, Utah, Wash; St Anthony Uranium  
Corp, Colo, N Mex)

**MANGANESE, INC**  
500 Fifth Ave., New York 36  
Pres: W M Weaver, Jr.  
Chairman of Bd: W Lumford Long  
Exec VP: Hewitt S West, Jr.  
VP, Charge of Oper: F A McGonigle  
Sec: Charles R Skinner  
Treas: J F Wilmoth  
(See Nev)

**MERCURY & CHEMICALS  
CORP**  
343 Madison Ave., New York 17  
Chairman of Bd: Bernard J Chubel  
Pres: Richard P Fischer  
VP & Sec: E Haring Chandor  
Treas: George Ornstein  
(See Ariz)

**METAL & THERMITE CORP**  
100 Park Ave., New York  
(See Va)

**MIAMI COPPER CO (COPPER  
CITIES DIV)**  
61 Broadway, New York 6  
Pres: E H Wettske  
Treas: John G Greenough  
VP: H J Pfohlott  
Sec: Henry Kaufman  
(See Ariz & Copper Cities Div, Ariz  
& N Y)

**MOLYBDENUM CORP OF  
AMERICA**  
375 Park Ave., New York 23  
Pres: Mark Hirsch  
Exec VP: Emil A Lucas  
Sec: James S Crawford  
Treas: William A Kuntz  
(See Calif, Colo, N Mex, Pa)

**NAT'L LEAD CO**  
111 Broadway, New York 6  
Pres: Joseph A Martino  
VP: Alfred H Drewes, Frank J  
Koehler, David A Merson,  
Joseph H Reid, William J Welch,  
Harry C Wilson  
Sec: John B Wetherich  
Treas: Joseph J Moreman, Jr  
Comptroller: George A Dewey  
**TITANIUM DIV MINE**, Tahawus,  
Essex County, Bemidji, magnetite  
(See Ariz, Calif, Colo, Kans, La, Mo,  
Mont, Tenn, Tex, Utah, Wyo)

**NAT'L POTASH CO., SUBSIDIARY  
OF FREEPORT SULPHUR CO &  
PITTSBURGH CONSOL  
COAL CO**  
205 E 42nd St., New York 17  
Pres: R C Wells  
VP: T G Ferguson & W B Porterfield  
Sec: M L Pierson  
(See N Mex)

**NEW JERSEY ZINC CO, THE**  
160 Front St., New York 36  
Pres: R L McCann  
VP, Min & Explor: S S Goodwin  
Treas: Samuel Riser, Jr  
Purch Agt: W C Daniel  
(See Colo, Ill, N J, N Mex, Pa, Tenn,  
Va, Wis)

**NEW YORK & HONDURAS-  
ROSARIO MNG CO**  
Rm 1855, 120 Broadway, New York 5  
(See subsid Rosario Explor Co, Colo  
& N Y)

**NEWMONT MNG CORP**  
300 Park Ave., New York 22  
Pres: P Malozemoff  
VPs: M D Banghart, R C Bonebrake  
Sec: Carroll Sears  
Treas: W T Smith  
Purch Agt: H W Volkman  
Control: W P Schmidt  
(Wholly own Resurrection Mng Co,  
Colo; has operating interest in Idaho  
Mng Co, Colo; controls Dawn Mng Co,  
Wash)

**NORBUTTE CORP**  
405 Park Ave., New York 22  
Pres: Nicolas M Salgo  
Int VP: Howard M Plant  
VP: Morton S Muller  
Compt: Sheldon E Perlman  
Sec: Seymour Flance  
Treas: Wm H Rose  
(See Utah)

**NORTHERN MINERALS, INC**  
Keesville  
Pres: K D Burnham

**PACIFIC TIN CONSOL CORP**  
120 Broadway, New York  
(See subsidiary, Feldspar Corp, Ga,  
NC, Tenn)

**PANAMINAS, INC**  
230 Park Ave., New York  
VP: J M Robison

**PHELPS DODGE CORP**  
300 Park Ave., New York 22  
Chairman of Bd: L S Gates  
Pres: R G Page  
VPs: C E Dodge, G R Drysdale,  
J M Hawkins, C R Kuzell  
Ass't VP & Sec: J E Masten  
Mgr of Explor: H Z Stuart  
Compt: J M Hawkins  
Ass't Compt: K A Lawrence, A P  
Peterson  
Treas & Ass't Sec: M W Urquhart  
Ass't Sec-Treas: R D Barnhart  
Ass't Sec-Treas: H R Dobbs  
Gen Purch Agt: P G Lee  
Gen Traffic Mgr: J W Lee  
Ass't Gen Traffic Mgr: B Fonessa,  
H Wright  
(See Ariz, N Mex, & Phelps Dodge  
Corp, N Y & Tex)

**PHELPS DODGE REF CORP,  
SUBSIDIARIES OF PHELPS DODGE  
CORP**  
300 Park Ave., New York 22  
Chairman of Bd: Walter C Bennett  
Pres: C S Harloff  
VP: Howard Barkell, C H Winship, Jr.  
C E Dodge  
Sec: J B Beatty  
Treas: M W Urquhart  
Purch Agt: P G Lee  
Ass't Sec: H R Dobbs, R D Barnhart  
Compt: J M Hawkins  
**LAUREL HILL REF & SMLTR**,  
Laurel Hill, Cu, S, Ni, Selenium,  
Tellurium  
Pl Mgr: F W Richardson  
(See Tex, Phelps Dodge Corp, Ariz,  
N Mex)

**PINEBROOK EXPLORATION INC**  
100 Park Ave., New York  
Pres: Philip D Wilson  
VP: J T Hall  
(See Colo)

**PITTSBURGH CONSOL COAL  
CO**  
(See Nat'l Potash Co)

**RAMAPO URANIUM CORP**  
Warwick  
Pres: Sidney Lieberman  
MINE  
Under devel

**REPUBLIC STEEL CORP**  
Republic Bldg, Cleveland Ohio  
OLD BED, HARMONY & FISHER  
HILL MINES, Mineralville, undergr., Fe  
Mgt: F J Myers  
Supt: J R Brennan, Sr, J R Murphy  
Eng: W A Blomstrand  
Maint Supt: J R Brennan, Jr  
Ch Eng: A K McClellan, Jr  
Prod: 2,000,000 tons per year  
**CHATEAUAGAY MINE**, Lyon Mt,  
undergr & surface, Fe  
Mgt: W G Crusberg  
Supt: Jos Tolosky, Sr  
Ch Eng: P J McMenamin  
Maint Supt: Howard Pigg  
Elec: Peter Daniels  
Prod: 1,250,000 tons per year  
**CHATEAUAGAY MILL**, magnetic  
Supt: J R Tolosky, Jr  
Ch Chem: J M Scott  
Prod: 385,000 tons conc per year  
(See Ala, Mich, Minn, Ohio)

**RESURRECTION MNG CO**  
Subsidiar of NEWMONT MNG CORP  
300 Park Ave., New York 22  
Pres: Fred Sears, Jr  
Sec: John E D Grunow  
Treas: W P Schmidt  
(See Colo & Newmont Mng Corp, N Y)

**REYNOLDS MINERALS CORP**  
27 William St., New York  
Pres: Douglas J Luckhurst  
VP: G C Ridland  
Sec: Joseph Masopust  
Treas: Robert J Stiro  
(See Colo)

**RUBBEROID CO**  
500 Fifth Ave., New York  
MINE, Wheatland Center  
(See Ut)

**RUTILE MNG CO OF FLA**  
111 Broadway, New York  
Pres: Charles C Morris, Jr  
VP: John Ross  
Sec: A J Drexel Paul, Jr  
Treas: Peter E Connell  
(See Fla)

**ST JOSEPH LEAD CO**  
250 Park Ave., New York 17  
Pres: Andrew Fletcher  
VP: C Merrill Chapin, Jr, Francis  
Cameron, Chas R Ince, R J  
Mechin  
VP & Treas: G I Brigden  
Ass't VP: Robert H Ramsey  
Ass't Treas: E P Merrill  
Cont & Ass't Treas: James G Colvin  
Sec: D K Louries  
Ass't Sec: W J Elliot  
**EDWARDS & BALMATE MINES**,  
Balmat, St Lawrence County,  
undergr., Zn, Pb, Fe  
Mgt: Marshall G Jones  
(See Mo, Pa)

**SHATTUCK DENN MNG CORP**  
120 Broadway, New York 5  
Pres: Thomas Bardon  
VP: S S Shattuck  
Ass't VP: R J Higgins, T W Newell,  
D M Kenro  
Sec: John A Moss  
Treas: Thomas V Toszi  
(See Ariz, Colo)

**SOUTHWEST POTASH CORP**  
(Subsidiar of THE AMERICAN METAL  
CLIMAX, INC)  
161 Broadway, New York 6  
Pres: T W Childs  
VP: John Payne, Jr, T G Moore,  
Thomas J Camo, Jr, F H  
Stewart, Jean Villeguez  
Sec: E A Well  
Treas: Hans A Vogelstein  
Cont: Herbert S Cohen  
(See N Mex)

**TEXAS GULF SULPHUR**  
75 E 46th St., New York  
Chairman of Bd: F M Nelson  
Pres: C O Stephens  
VP: E C Meagher, E F VanderStucken,  
Jr, C F Fogarty  
Purch Agt: R L Carter  
(See Tex)

**TRI-STATE ZINC, INC**  
123 Williams St., New York 38  
Pres: R F Player  
VP: V C Allen  
Sec-Treas: J H Nicholls  
(See Ill, Va)

**TUNGSTEN MNG CO**  
**TUNGSTEN MNG CORP**  
500 Fifth Ave., New York 38  
Chairman of Bd: L W Long  
Pres: Wm M Weaver, Jr  
VP: P A McGonigle, H S West, Jr  
Sec: C R Skinner  
Treas: J F Wilmoth  
(See N C)

**UNION CARBIDE NUCLEAR  
CO, DIV OF UNION CARBIDE  
CORP**  
30 E 42nd St., New York 17  
Pres: Lyman A Bliss  
VP: Clark E Center, L M Currie,  
S J Cromer, Oscar F Holmgren,  
A Q Lundquist, W M Smart  
(See Calif, Colo, Utah)

**U S BORAX & CHEM CORP**  
**U S POTASH CO DIV**  
30 Rockefeller Plaza, New York  
Pres: J M Gerstley  
VP & Gen Mgr: P J O'Brien  
Sec: W A Scherman  
Treas: R C Costa  
Purch Agt: J C Walker  
Ass't Gen Mgr: R F Steel  
VP & Gen Mgr Pacific Coast Borax  
Co Div: J F Corkill  
VP & Gen Mgr US Potash Co Div:  
Dean J Sidney  
VP 20 Mule Team Prods Div:  
D V Parker  
VP of Foreign Opr: N C Pearson  
VP: Paul Speer  
Ass't Treas: J H Hadfield  
Ass't Sec: Gertrude B Stehler  
(See Calif, N Mex)

**VANADIUM CORP OF AMER**  
42 Lexington Ave., New York 17  
Pres: W C Keeley  
VP, Mng: D W Viles  
Sec: D A Shriver  
Purch Agt: F W Thomas  
Treas: L C Miller  
(See Ariz, Colo, N Mex, Utah)

**VULCAN SILVER LEAD CORP**  
100 Park Ave., New York 17  
Pres: J T Hall  
VP: R F Mahoney, H J Null  
Sec-Treas: E A Salo  
(Property trans'd to Pinnacle Expl  
Co, Inc)

## North Carolina — Oklahoma

**WAH CHANG CORP**  
233 Broadway, New York  
Chmn of Bd: K C Li  
Eng: T K Li  
Gen Mgr: J J Strutz, Jr  
Asst Gen Mgr: George Reed  
**TUNGSTEN REFINERY**, Glen Cove  
(See Calif., Nev., Tex., & E A Scholz &  
J H Caxier, Ariz.)

## NORTH CAROLINA

### APPALACHIAN SULPHIDES INC

6th Flr, 380 Bay St, Toronto,  
Ontario, Canada  
Pres: J Cunningham-Dunlop  
VP: W H Woods  
Treas: H E Nause  
Sec: Phillip Bastedo (New York City)  
**ORE KNOW MINE**, Jefferson, under-  
gr. Cu, Au, Ag  
Gen Mgr: J F Cowley  
Mine Mgr: Philip Eckman  
Prod: 350 tons  
**700-TON MILL**, at mine  
(See Vit.)

### CAROLINA PYROPHYLLITE CO

104 E Wendover Ave, Greensboro  
VP: John E Boyd  
**MINE & MILL**, Staley  
**MINE & MILL**, Glendon

### CHESAPEAKE & COLORADO CORP

308 18th St, N W, Washington 8,  
D C  
**MOUNT CELO & BAILEY MINES**,  
Spruce Pine, feldspar, mica  
Gen Supt: Tom Campbell  
Prod: 2,000-8,000 lbs book mica  
weekly  
(See Colo.)

### FELDSPAR CORP, THE

Box 335, Spruce Pine  
Pres: N Cleveland  
VP: F S Miller, C P Rogers, Jr  
Sec-Treas: Glenn N Blevins  
**MINE**, Spruce Pine, surface,  
feldspar  
Gen Mgr: Carroll Rogers, Jr  
Asst Gen Mgr: P C Coletta  
Supt: Ralph Hughes  
Met: L L McMurray  
Frm: Robert Boone  
**FLOT MILLS**, Spruce Pine  
Supt: Ralph W Hughes, Spruce Pine  
Asst Supt: Carl Burleson, Spruce  
Pine  
Total Capacity: 1,000 tons per day  
(Subsid of Pacific Tin Consol Corp, NY)  
(See Ga., Tenn.)

### FOOTE MINERAL CO

18 W Cheaten Ave, Phila 44, Pa  
Pres: L G Hiss  
VP: F R Shay  
Sec: W Spofford  
Treas: J S Gates  
Purch Agt: W M Raynor  
**KINGS MT DIV MINE**, Kings Mt,  
open pit, Spodumene  
Mine Frm: R L Day  
Mine Supt: R C Flow  
Mine Eng: M Huston  
Plant Eng: W A Eldon  
Plant Acc: D R Smith  
Gen Mgr: N O Johnson  
Asst Gen Mgr & Gen Sup: E R Goter  
Geol: T L Kesler  
**HEAVY MEDIA FLOT MILL**, at mine  
Mill Supt: T J Albrecht  
Mill Frm: T Gordon  
Assayer: M Carpenter  
(See Pa., N H, Tenn., Va.)

**INTERNAT'L MINERALS & CHEMICAL CORP**  
20 N Wacker Dr, Chicago 4, Ill  
**MINE**, Kona, open pit, feldspar, mica  
Gen Supt: L W Breman, Jr  
Asst Gen Supt: Robah Thomas  
Mine Supt: C Buchanan  
Gen Frm: Clyde Brinkley  
Prod: 1,000 tons  
**MINE**, Spruce Pine, open pit, feldspar,  
mica  
Gen Supt: Charles Hickey  
Asst Gen Supt: Claude Thomas  
Mine Supt: C Stamey  
Prod: 700 tons  
**FLOT PLANTS**, at mines  
(See Ariz., Colo., Ill., Fla., Mo., Miss.,  
N Mex., Ohio, S D, Tenn., Va., Wyo.)

### KINGS MT MICA CO, INC

Box 700, Kings Mt  
Pres: James B Preston, Jr  
Sec: Hamilton Douglas, Sr  
Treas: H Gunter  
Gen Mgr: Paul A Lancaster  
**PATTERSON MINE**, 2 mi NW of  
Kings Mt, surface, mica  
Prod: 400 tons  
**400-TON MILL**, at mine  
Mill Supt: James E White  
**MOSS MINE**, 4 mi SW of Kings Mt,  
surface, mica  
**400-TON MILL**, at mine  
Mill Supt: Marvin Lancaster

### LAWSON UNITED FELDSPAR & MINERAL CO

Spruce Pine  
Pres: R W Lawson  
VP: Robert Lawson, Branch Lawson  
Sec-Treas: C D Lawson  
**MINE**, Minpro, open pit, Feldspar,  
mica  
Gen Mgr: Thomas L Lawson

### LITHIUM CORP OF AMERICA INC

Bessemer City  
**BESEMER CITY MINE**, open pit,  
lithium compounds from spodumene  
Mine Mgr: J N McClure  
**CHEMICAL PLANT**, Bessemer City  
Plant Mgr: R N Nielsen  
(See Minn.)

### PACIFIC TIN CONSOL CORP

(See NY, The Felspar Corp)

### SOUTHERN MICA CO

Johnson City, Tenn  
**SULLINE MINE**, Spruce Pine, open  
pit, mica  
Gen Mgr: C Bailey Rice  
Gen Supt: George W Edge  
Mine Frm: Cecil Renfroe  
(See Tenn.)

### STANDARD MINERAL CO

Ridgeline  
Pres: F B Vanderbilt  
VP: H B Vanderbilt  
Sec: Fred Chappell  
Treas: C Gens  
Purch Agt: W J Woodward  
**MINE**, undergr., open pit, pyrophyllite  
Gen Mgr: Fred Chappell  
Asst Gen Mgr: Roy Harris  
Eng: Paul Ward  
Mine Frm: Cecil Horner  
**FINE GRINDING MILL**, at mine  
Mill Frm: H L McLaurin  
Capacity: 75,000 tons annually

### TUNGSTEN MNG CORP

PO Box 931, Henderson  
VP & Gen Mgr: James R Sweet  
Gen Supt: W R Atkins  
Purch Agt: G V Boyd  
Ch Eng: A M Skyniewski  
Master Mech: W F Edwards  
**HAMME MINE**, Tungsten, undergr.,  
WO<sub>3</sub> concentrates, hubnerite,  
synthetic scheelite  
Mine Supt: E H Roberts  
Asst Mine Supt: J W Aker  
Mine Eng: Philippa A Hager  
Prod: 1,100 tons  
**530-TON FLOT-GRAV MILL**, Tungsten,  
Syn Scheelite  
Pl Supt: Carl F Gommel  
Asst Pl Supt: J V Hammie  
Mill Frm: R Lee Angel  
Assay: S B Adams  
(See NY)

## OHIO

### AMERICAN ZINC OXIDE CO

(Subsid of AMERICAN ZINC, LEAD & SMELT CO)  
1515 Paul Brown Blvd, St Louis  
1, Mo  
**REFINERY**, Columbus  
VP & Gen Mgr: A C Elde  
Gen Supt: W T Maidens  
Purch Agt: C M Chambers  
(See Ariz., Ill., Mo., Okla., Tenn., Tex.,  
Wash., Wis.)

### BASIC INCORPORATED

845 Hanna Bldg, Cleveland 15  
Pres: H P Eells, Jr  
Purch Agt: G H Rutherford  
**MAPLE GROVE QUARRY & PLANT**,  
(Mail: Postorial), Maple Grove,  
Seneca County, surface, dolomites  
Works Mgr: A M Cato  
(See Nev.)

### BUTLER BROS

1300 Leader Bldg, Cleveland 14  
Chmn of Bd: Patrick Butler  
Pres: G W Humphrey  
VP: R C Fish, J C Rieger  
Sec: L W Spang  
Treas & Asst Sec: C W Gardner  
(See Minn.)

### CLEVELAND-CLIFFS IRON CO, THE

1460 Union Commerce Bldg,  
Cleveland 14  
Chmn of Bd: A C Brown  
Pres: W A Sterling  
Asst to Pres: Grover J Holt  
VP: D R Forrest  
VP, Mng: C W Allen  
VP, Finance: H S Harrison  
VP, Law: J H Kerr  
VP, Sales: J S Wilbur  
VP, Marine Dept: H L Gobelle  
Asst VP, Mng: Fayette Brown, Jr  
(See Mich., Minn.)

### CONSUMERS ORE CO

1300 Leader Bldg, Cleveland 14  
Chmn of Bd: J H Thompson  
Pres: G W Humphrey  
VPs: R C Fish & J C Rieger  
Sec: L W Spang  
Treas & Asst Sec: C W Gardner

### CONTINENTAL MINERAL PROCESSING CORP

1st Nat'l Bank Bldg, Cincinnati 2  
Pres & Gen Mgr: Frederick A Hauck  
VP: Albert E Orogan, G D Slaughter  
Sec: Vincent H Beckman  
(See Fla.)

### DOUGLASS MINING CO

1300 Leader Bldg, Cleveland 14  
(M A Hanna Co, Agts)  
Chmn of Bd: J H Thompson  
Pres: G W Humphrey  
VP: R C Fish, J C Rieger  
Sec-Asst Treas: S L Engel  
Asst Sec: F W Bennett  
Treas: R H Bartholomew  
(See Minn.)

### EAGLE-PICHER CO, THE INSUL DIVISION

American Bldg, Cincinnati  
Pres: T Spencer Shore  
VP & Comptroller: Carl A Geist  
VP & Rm Dic: Wm R Dice  
VP & Gen Mgr, Mng & Smelt Div:  
O A Rockwell  
VP & Gen Mgr, Check Div:  
Miller M Zoller  
VP & Gen Mgr, Fabricon Div:  
Louis A Fisher  
Sec: Richard Stevens  
(See Ill., Kans., Nev., Okla., Wis.)

### M A HANNA CO, THE

1300 Leader Bldg, Cleveland 14  
Agent for the following companies:  
Butler Bros, Consumers Ore Co,  
Douglas Mining Co, Hanna Coal &  
Ore Corp, Hanna Iron Ore Div  
(Nat'l Steel Co), Hanna Ore Mining  
Co, Morton Ore Co, Ozark Ore Co,  
Philbin Mining Co, Richmond Iron  
Co, South Agnew Mining Co  
(See Oreg.)

### HANNA COAL & ORE CORP

1300 Leader Bldg, Cleveland 14  
Chmn of Bd: J H Thompson  
Pres: G W Humphrey  
VP: J W Buford, J K Gustafson  
Sec: L W Spang  
Treas: W C Pieper  
Asst Treas: R E Beal, R H Bartholomew  
Asst Sec: L E McChesney, W C Pieper,  
S L Engel  
(See Mich., Minn.)

### HANNA IRON ORE DIV NAT'L STEEL CORP

1300 Leader Bldg, Cleveland 12  
Chmn of Bd: J H Thompson  
Pres: G W Humphrey  
VP: R C Fish, J C Rieger  
Asst Secs: S L Engel, F W Bennett  
Treas: R H Bartholomew  
Asst Treas: S L Engel  
(See Mich., Minn.)

### HANNA ORE MINING CO

1300 Leader Bldg, Cleveland 14  
Chmn of Bd: J H Thompson  
Pres: G W Humphrey  
VPs: R C Fish, J C Rieger, R W  
Whitney  
Sec-Asst Treas: S L Engel  
Asst Sec: F W Bennett  
Treas: R H Bartholomew  
(See Minn.)

**MONTREAL MNG CO**  
(See Oglebay Norton & Co, Ohio,  
and Montreal Mng Co, Wis.)

### OGLEBAY NORTON & CO, AGENTS, MONTREAL MNG CO

Hanna Bldg, P O Box 6508,  
Cleveland 1  
Pres: Harry S Taylor  
VP: Courtney Burton, Fred R White  
VP & Treas: E W Sloan, Jr  
Sec & Gen Counsel: John D Dwyer  
(See Oglebay Norton & Co, Minn., &  
Montreal Mng Co, Wis.)

### OZARK ORE CO, (SUBSID OF HANNA COAL & ORE CORP)

1300 Leader Bldg, Cleveland 14  
Pres: G W Humphrey  
VPs: R C Fish, C Rieger  
Sec & Asst Treas: S L Engel  
Treas: R H Bartholomew  
(See Hanna Coal & Ore Corp, Mich.,  
Minn., Mo., Ohio, & Ozark Ore Co,  
Mo.)

### PICKARDS MATHER & CO

2000 Union Commerce Bldg,  
Cleveland 1  
Managing operators for BALKAN MNG  
CO, BENNETT MNG CO, BIWA BKK  
MNG CO, CAMPBELL MNG CO,  
CORSICA IRON CO, CREATE MNG CO,  
CUYUNA ORE CO, ERIC MNG CO,  
HOYT MNG CO, IRON RANGE MNG  
CO, LAKE MNG CO, MAHONING  
ORE & STEEL CO, ONTARIO IRON  
CO, SAGAMORE ORE MNG CO,  
SYRACUSE MNG CO, UTICA MNG  
CO, VERNILLION MNG CO,  
WESTERN MNG CO, YOUNGSTOWN  
MINES CORP  
(See Minn., Mich., Wis.)

### REPUBLIC STEEL CORP

25 Prospect Ave NW, Cleveland  
Pres: T F Patton  
VP: E R Johnson  
Asst VP: E B Winning  
Purch Agt: W T Adams  
(See Ala., Mich., Minn., N Y)

### RESERVE MINING CO

(Owned by Republic & Armco Steel  
Corp)  
Guildhall Bldg, Cleveland 14  
(See Minn.)

### SOUTH AGNEW MNG CO

1300 Leader Bldg, Cleveland 14  
Pres: A F Peterson  
VPs: R C Fish, G W Humphrey  
Sec: L W Spang  
Treas & Asst Sec: C W Gardner  
(See Minn.)

### STANDARD SLAG CO, THE

1200 Wick Bldg, Youngstown  
Pres: L A Breyhill  
VP: W E Bliss  
Sec: W H Kilcawley  
Asst Sec: R M Lunch  
Purch Agt: R L Stevenson  
Ch Eng: A W Porter  
(See Nev.)

## OKLAHOMA

### AMER ZINC, LEAD & SMELT CO

Picher  
Dist Mgr: J J Inman  
Gen Supt: O L Green  
Geol: Dan R Stewart  
Mech Eng: W F Netzeband  
Met: R A Ammon  
RIALTO, BARBARA J & LAWYERS MINES, undergr. Zn, Pb  
Mine Supt: Bert Hudleston  
Prod: 1,300 tons  
1,200-TON GRAV-FLOT MILLS  
Mill Supt: W H Shepard  
(See Ariz., Ill., Mo., Ohio, Tenn., Tex.,  
Wash., Wis.)

### BLACKWELL ZINC CO, INC

(Subsid of THE AMERICAN METAL CLIMAX, INC)  
61 Broadway, New York 6, N Y  
Pres: H de Neuville  
VP: W J Cloud, E T Rose, W E Long,  
J Vuillequez, J Payne, Jr,  
A E Lee  
Sec: E A Well  
Treas: D J Donahue  
Purch Agt: W F Price  
Controller: H S Cohen

## Oregon — Pennsylvania

**SMEETER**, Blackwell  
Mgr: M L Huguen  
Prod: 86 tons Zn yrly  
(See American Metal Co., Ltd., N.Y.)

**BUFFALO MNG CO, THE**  
Box 241, Picher  
Pres: W L Childress  
VP: Paul Childress  
Sec-Treas: H L Childress  
Purch Agt: Wm G Roberts  
JOE BUFFALO MINE, 1 1/2 mi E  
of Picher, undergr., Zn, Pb  
Frn: Ben F Bailey

**CONTACT MNG CO, INC**  
10 E Central Ave, Miami  
(Box 848)  
Pres: Orville Moore  
VP & Gen Mgr: Finis Bryan  
Sec: V W Sapp  
Treas: G W Sapp  
Asst Mgr: Orville Moore  
**CONTACT MINE (SOUTHSIDE LEASE)**  
near Cardin, undergr., Zn, Pb  
Prod: 200 tons

**CORONADO MINES, INC**  
200 Wright Blvd, Tulsa 3  
Pres: Milton Leon  
VP: S P Bowyer  
Sec-Treas: A F Bourne  
(See Ariz)

**EAGLE-PICHER CO, THE**  
**MNG & SMELT DIV**  
1st Nat'l Bank Bldg, Miami  
Pres: T Spencer Shore  
VP & Gen Mgr: O A Rockwell  
Asst to Gen Mgr: Claude Dale  
Comptroller: G H Walbert  
**TRI-STATE MINES, Zn, Pb**  
Office Address: Cardin  
Gen Mgr: J F Cuddeback  
Asst Gen Mgr: J B Elizondo  
Geol: Douglas Brooks  
Dir Personnel & Labor Rel: C D Wood  
**CENTRAL GRAV-PILOT MILLS**, Cardin  
Mill Supt: Fred Phelps  
ZINC SMELTER, Henryetta  
Supt: John Wade  
(See Ill, Kan, Nev, Okla, Wis)

**HARRISON GYPSUM, INC**  
P O Box 176, Lindsay  
MINE, near Cement, surface, gypsum

**KERR-McGEE OIL INDUSTRIES, INC**  
Kerr-McGee Bldg, Oklahoma City  
Pres: D A McGee  
VP: A T F Seale (Shiprock, N Mex)  
Sec: J H Lollis  
Treas: S B Robinson  
Purch Agt: D W Lindsay  
(See Ariz, Colo, N Mex, Wyo, and  
Kermac Nuclear Fuels, Colo, N Mex)

**MARK TWAIN MNG CO, THE**  
Box 241, Picher  
Pres: W L Childress  
VP: W H Childress  
Sec-Treas & Gen Mgr: H L Childress  
Purch Agt: Wm G Roberts  
Min Frn: C A Enders  
**JARRETT MINE**, 2 mi W & 3 mi N  
of Picher, undergr., Zn, Pb  
**SKELTON MINE**, 1 mi S of Picher,  
undergr., Zn, Pb  
(See Kans)

**OZARK-MAHOMING CO MINING DIV**  
310 West 9th St, Tulsa 19  
Chmn of Bd & Pres: S H Davis  
Pres: C O Anderson  
VP & Gen Mgr: A G Johnson  
Sec: R T Landmark  
Comtr: K R McWilliams  
Gen Supt: H E Ballis  
Gen Supt, Western Div: R K Wisco  
Supt of Min: Wayne W Fowler  
Supt of Min: Ed Powell  
Geol: E A Breckle, Forrest Hansen,  
C W Taft  
Purch Agt: W Schosky  
(See Colo, Ill, N Mex)

**PHILLIPS PETROLEUM CO.**  
**MNG & MLG DEPT**  
Barlingville  
Mgr: T M Hipp  
Tech Asst: Bradley Skinner  
(See N Mex, Utah)

**TONGANA MINING CO**  
Box 368, Picher  
Pres: Clarence A Miller  
VP & Gen Mgr: O K Tucker  
Sec: W A Brewer  
**KITTY MINE**, 2 mi W of Picher,  
undergr., Zn, Pb  
Mine Frn: Leslie L Marcus

**TULSA MINERALS CORP**  
Box 5216, Tulsa  
Pres & Gen Mgr: J S Burden  
VP: P T Thibodaux  
Sec & Treas: W G Eastman  
Purch Agt: John W Cleary  
(See Ariz)

**S A WALTON & SONS**  
Fairview  
MINE, near O'Keene, Blaine County,  
surface, gypsum

**UNIVERSAL ATLAS CEMENT CO**  
100 Park Ave, New York 17  
**WATONGA MINE**, Blaine County,  
surface, gypsum

**W M & W MNG CO**  
Picher  
MINE, Ottawa County, Zn, Pb

## OREGON

**ARENTH COMSTOCK MINING VENTURE**  
870 First Security Bldg,  
Salt Lake City, Utah  
**BRETZ MINE**, McDermitt, open pit,  
Mercury  
Gen Mgr: Sam S Arenth  
Gen Supt: Roy Hickman  
Asst Supt: Paul Sorenson  
Mine Eng: William Deason  
150 TON PILOT MILL, at mine  
Mill Supt: Roy Hickman  
(See Utah)

**PAT ARNOT DRILLING & EXPL CO**  
1601 Hwy 198, Grants Pass  
Gen: Pat Arnott  
**BLACK HAWK MINE**, undergr.,  
placer, Sal: Rock, Cr-A  
Mile

**ASHLAND MINING CO**  
835 N Main St, Ashland  
Mgr: Dewey & Fred Van Curter  
**ASHLAND MINE**, 3 mi NW of  
Ashland, undergr., WO, Cr  
50-TON GRAV MILL & CONCEN  
MATTERN MINE, 2 mi N of  
Ashland, undergr., WO  
Prod: 5-10 tons

**BRISTOL SILICA CO**  
Box 427, Rogue River  
Free: Fayette I Bristol  
**BRISTOL MINE**, 5 mi E of Rogue  
River, surface, silica  
Mine & Mill Supt: Holland Jones  
Conc Eng: A O Barrell  
Prod: 200 tons  
Mill, Roger R, Cap: 100 tons

**COBAR MINES INC**  
Box 731, Redmond  
Pres & Geol: Frank Reid  
Vt: Keith Parkinson  
Sec-Treas: George Rakestraw  
**MOTHER LODE & ROUND MT MINES**,  
Crook County, open pit, Hg  
Under devel

**CORDERO MINING CO**  
131 University Ave, Palo Alto, Calif  
Gen Mgr: J Eldon Gilbert  
**HORSE HEAVEN MINE**: Ashwood  
46 mi E of Madras, undergr., surface,  
Hg  
Gen Supt: Verne Haas  
Mine Supt: F E Lewis  
Gen Frn: C J McClain  
Prod: 30 tons  
30-TON ROAST MILL, 17 mi E of  
Ashland  
(See Calif, Idaho, Nevada)

**AL DUNN CONCENTRATING PLANT**  
Canyon City  
Own: Albert Dunn  
**CARLSON MINE**, Dog Creek Rd,  
Canyon City, open pit, Cr  
Mine Frn: Lawrence Robo  
Prod: 25-30 tons  
30-TON GRAV MILL

**EICKEMEYER BROS**  
Post  
**MAURY MT MINE**, Crook County, Hg  
**FINDLAY, GLENN**  
Box 41, Canyon City  
**KINGSLEY MINE**, Grant County,  
undergr., Cr  
Gen Mgr: Bandy Sintay  
Prod: 175 tons annually

**GARDNER MNG CO**  
Canyon City  
Part: Wm W, John & Wm N Gardner  
**HAGGARD & NEW MINE**, Grant  
County, Cr  
**WARD & ZERO MINES**, Grant  
County, Cr  
Idle

**GALLAHER, J G**  
716 NE "A" St, Grants Pass  
**OREGON CHROME MINE**, Josephine  
County, Cr

**GRABNER, KENNETH**  
2310 Second St, Baker  
**RECORD GOLD MINE**, Baker,  
undergr., Au  
Infer devel  
10-TON MILL, at mine

**GREAT LAKES CARBON CORP, MNG & MLG PROD DIV**  
Terrebonne  
**PLANT NO 2**, surface, diatomaceous  
earth  
Supr: E W West  
(See Calif, Colo, Nev, N.Y.)

**HANNA COAL & ORE CORP, ORE DIV, (SUBSID OF M A HANNA CO)**  
PO Box 305, Riddle  
**NICKEL MTN MINE**, surface, Ni  
Gen Mgr: E S Molland  
Mine Supt: E J Maney  
Mine Frn: H J Servant  
Mine Eng: W A Foster  
Prod: 6,000 tons  
(See Mich, Ohio)

**HANNA NICKEL SMELTING CO, (SUBSID HANNA COAL & ORE CORP)**  
Box 305, Riddle  
Gen Mgr: E S Molland  
ELEC MELT PLANT  
Pl Mgr: E E Coleman  
Sup: L E Rosser  
Prod: 17,000,000 lbs nickel yrly

**H-1 POTENTIAL MINES**  
Main & River Sts, Cottage  
Grove  
Owner: Ray E Nelson  
**UTOPIAN, SWEEPSTAKES & HIAWATHA GROUPS**, 36 mi SE  
of Cottage Grove, undergr., Au, Ag,  
Cu, Pb, Zn  
Under devel  
**6-TON GRAV MILL**, Phoenix  
**VEUSUVIUS MINE**, Bohemia, undergr.,  
Au, Ag, Cu, Pb, Zn, Mn  
(Under lease)

**KINSELLA & LAMBRETH**  
John Day  
Part: Jim Kinsella, David Lambeth  
**LAST CHANCE MINE**, Grant County,  
Cr

**LAKEVIEW MNG CO**  
Marble Theatre Bldg, Lakeview  
Pres: Dr Garth W Thornburg  
VP: John Murchison, Perry Bass  
Sec: R T Conn  
Asst Sec: Vance Thornburg  
**WHITE KING & LUCKY LASS MINES**,  
16 mi NW of Lakeview on Auger Creek,  
undergr., UOg  
Gen Mgr: James F Poulos  
Geol: Howard B Dutro  
Asst Geol: Philip S Wein  
Mine Frn: Carroll Flick  
Under devel

**MALHEUR MNG CO**  
411 NW 8th, Pendleton  
Pres: Elton B Taylor  
VP: Norman Wastrom  
Sec: Wm Morrison, Jr  
**RED DYKE MINE**, Rio I, Huntington,  
open pit, Au  
Prod: 15 tons  
**15-TON MILL**, near Malheur City,  
Malheur County

**MAIA MINES, INC**  
Box 382, Prineville  
Pres & Geol: Frank O Reid  
Sec-Treas: J H Douglas  
**BLUE RIDGE MINE**, open pit, Hg  
40-TON MILL, Ochoco dist

**MINERAL KING MINE**  
34 S River Rd, Cottage Grove  
Own: Harry Williams, Roy Nelson  
Mine, Bohemia dist, undergr., Cu,  
Au  
Under devel

**MOOTHART & WRIGHT**  
Box 482, John Day  
Part: Arthur Moothart, Wm Wright  
**RED HILL, DRY CAMP & CURTISS MINES**, Grant County, Cr

**OLSSON, HAROLD & PRINGLE, E W**  
Ronan, Montana  
**GLASS BUTTE MINE**, Lake County,  
Hg  
Under devel

**OREGON CHROME MINES, INC**

Box 475, Grants Pass  
**ROBERTSON CHROME MINE**, Oak  
Glen, 15 mi NW of Selma, undergr.,  
Cr  
Gen Mgr: William S Robertson  
Sup: C O Anderson  
Prod: 10 tons

**PATTEN, W B**  
Culp Creek  
**EL CAPITAN QUARTZ & GLENWOOD PLACER**, St Peters Cr, Bohemia dist,  
Au, Sb, Pb, Cu, Zn  
Prod: 10 tons

**PROFILE TAMARACK MINES CO**

c/o E P Slovarp, 308 SW 4th Ave,  
Portland 4  
Pres: Charles E Thompson  
VP & Purch Agt: Henry T Abstein  
Sec-Treas: Emile P Slovarp  
(See Idaho)

**SEIFERT LUMBER CO**  
Selma

-Part: J T & T K Seifert  
**BRIGGS CREEK MINE**, 24 mi W of  
Selma, open pit, undergr., Cr  
Prod: 4 tons  
20-TON MILL, Selma

**O W STUERMPEGES & SONS**  
Box 8, Myrtle Creek  
"A" MINE, Douglas County, Cr, Cu,  
Fe  
Idle  
"B" MINE, open pit, Cr, Fe  
Under devel

**SUNBURST URANIUM CORPORATION**

1075 NW Everett St, Portland 9  
Chmn of Bd: Walter H Schwedler  
Pres: James C Young  
Exec VP: Dr Sam B Liu  
VP: Ernest L Miller, Harold P Ridings, Dr Bryan D Lee  
Sec-Treas: Kay Critchlow  
(See Nev, Utah)

**UNITED PACIFIC MNG CORP**  
2675 Willamette St, Eugene  
Pres: Roy C Barr  
VP: M L Gass  
Sec: A Einman  
Treas: Warren C Glaeds

**VAD-ORES EXPLOR CO**  
633 Mod Arts Bldg, Portland  
Pres: V E Rudy  
Sec-Treas: T R Fyock

**C C WIKSTROM**  
Box 238, Powers  
**ROCK CREEK CHROME MINE**,  
Coos County, undergr, open pit, Cr  
Prod: 5 tons  
**POSTER CREEK CHROME MINE**,  
placer, Cr  
Idle

**WINTER CREEK MNG CO**  
5121 SW Cameron Rd, Portland  
**WINTER CREEK MINE**, Crook  
County, Hg  
Idle

## PENNSYLVANIA

**ALAN WOOD STEEL CO**

Conshohocken  
Pres: H R Wood  
VP Oper: W E Boger  
Sec: W B Cashmore  
Treas: W M Webb  
Mgt: L A Mohr  
Ch Eng: F C Schoen  
Dir, Personnel: C D Dorworth  
VP & Compt: H W Read  
(See N.J.)

**ALUMINUM CO OF AMERICA, MINING DIV**

1501 Aloha Blvd, Pittsburgh 19  
Pres: J L Magee  
Sec: Alfred M Hunt  
Treas: E B Wilber  
Purch Agt: Ralph Keever  
Gen Mgr: Ch: Lawrence Litchfield, Jr  
(See Ark, Ill)

**MINING WORLD**

## South Carolina — Tennessee

**AMERICAN METAL CLIMAX,  
INC., CLIMAX MOLYBDENUM  
CO DIV.**  
Langstroth  
(See Colo, N Y)

**AMERICAN METAL CLIMAX,  
INC., DUQUESNE DIVISION**  
61 Broadway, New York 6, N Y  
**SQUELTER**, Pittsburgh, Zinc-base  
alloy production  
Mgr: W F Techappat  
(See NY)

**BESTWALL GYPSUM CO**  
120 E Lancaster Ave, Ardmore  
Pres: Rawson G Lizaras  
Exec VP: Malcolm Meyer  
Sec: Arthur D Graves  
VP & Treas: C. J. Johnston  
Purch Agt: J I Trolley  
Asst Sec & Treas: J L Strickland  
(See Iowa, Kans, Mich, NY, Tex Utah)

**BETHLEHEM CORNWALL  
CORP**  
70 E Third St, Bethlehem  
Pres: A F Peterson  
Mgr: S J Shale  
**CORNWALL MINE**, Cornwall, Pa.  
Cu, Au, Ag, S  
6,000-TON MAG CONCENTRATOR  
2,500-TON PLOT PLANT  
1,600-TON SINTERING PLANT  
**GRACE MINE**, Morgantown, Pa, S  
MAG CONC, PLOT PLANT, pelletizing  
plant

**FOOTE MINERAL CO**  
18 W Chelton Ave, Philadelphia 44  
Pres: L G Blies  
VP: F B Shay  
Sec: W R Spofford  
Treas: J S Gates  
Purch Agt: W M Raynor  
Gen Prod Mgr: W B Towne  
(See N H, N C, Tenn, Va)

**INTERNAT'L SALT CO, INC**  
Scranton  
Pres: Edward L Fuller  
VP: H J Osborn, John L Ryos,  
Montimer B Fuller, Jr  
Edson Green, Myron L Hyman  
Sec: H J Osborn  
Treas: M B. Fuller, Jr  
(See N Y)

**JONES & LAUGHLIN STEEL  
CORP**  
3 Gateway Center, Pittsburgh 28  
Pres: H C Adams  
VP, Prod: A T Lawson  
Gen Mgr, Ore Mines & Quarries:  
C C Henning  
Sec: B F Jones, 3rd  
Treas: M H Wunderlich  
(See Mich, Minn, N Y)

**MOLYBDENUM CORP OF  
AMERICA**  
Washington  
Wks Mgr: Eugene F Lucas  
**PLANT**, Washington, Mo, Wo<sub>3</sub>  
Plant, York, Mo Wo<sub>3</sub>, rare earths  
Mgr: W F Allen  
(See Calif, Colo, N Mex, N Y)

**NEW JERSEY ZINC CO**  
R D #1, Center Valley  
MINE, Friedenville  
Supt: S S Huyett  
(See Colo, Ill, N J, N Mex, N Y,  
Tenn, Va, Wyo)

**ST JOSEPH LEAD CO**  
250 Park Ave, New York 17, N Y  
**SQUELTER**, Josephtown  
Mgr: John G Wehn  
(See Mo, N Y)

**SNYDER MINING CO**  
812 Oliver Bldg, Pittsburgh  
Pres: W P Snyder, Jr  
VP & Gen Mgr: A L Fairley, Jr  
Sec: W Laird Davis  
Treas: J K Foster  
(See Minn)

**U S STEEL CORP**  
625 William Penn Place, Pittsburgh  
B9  
(See Alaska, Ala, Calif, Minn, Tenn,  
Utah, Wyo)

## SOUTH CAROLINA

### COMMERCIAL LORES, INC

Box 98, Clover  
Pres & Gen Mgr: A R Eckel  
VP: H S Doty  
Sec: E A Jacobs  
Purch At: H L Wright  
**HENRY KNOB MINE**, 4 mi W of  
Clover, surface, kyanite, pyrite  
Gen Supt: John Strohl  
Mine Supt: Leonard Hardin  
500-TON PLOT MILL, at mine  
Mill Supt: Richard Lachmund  
Asst Mill Supt: John McGill  
Under devel

**HEAVY MINERALS CO**  
4000 N Hawthorne St,  
Chattanooga, Tenn  
pres: Carlisle Ward, Jr  
VP: John H Frame  
Sec: K L Kart  
Treas: Wm W Stephens, Jr  
**MARINE MINERALS PLACER**,  
Box 206, Clearwater,  
monazite, rutile, zircon, ilmenite,  
staurolite  
Gen Mgr: H C Laird  
Mine Supt: Grant Leeson  
Geol: C C Woo  
Eng: C C Cook  
Met: John C Craig  
Mine Eng: John M Munsenrider  
Mill: Clearwater  
Supt: M L Luckey  
(See Fla, Tenn)

**INDUSTRIAL MINERALS INC**  
York  
Pres & Gen Mgr: L G Wilson  
VP & Sec: W F Wilson  
**KINGS CR MINE**, 14 mi W of York,  
surface, barite  
Prod: 15 tons  
**KINGS CR MILL**, 45-ton, crush &  
grind

**MINERAL MNG CORP**  
Lancaster  
MINE, undergr, sericite mica  
Supt: Frederick Bingham

Sec: Gordon F Kamerer  
Dir: Charles M Webber  
HOLDUP NO 15, TADOS NO 3, II  
MINES, undergr, open pit, U<sub>3</sub>O<sub>8</sub>, V  
Gen Mgr: Roy E Chord  
Geol: Gordon Prescott  
Mine Supt: Walter McKenna  
Asst Mine Supt: Richard W Chord  
Prod: 100-200 tons  
Under devel

### COMMONWEALTH MNG CO OF S D

Box 992, Sioux Falls  
Pres: Merle M Johnson  
VP: C K Nott  
Sec-Treas: Oscar Shakstad  
**COMMONWEALTH MINE**, Deadwood,  
undergr, surface, U<sub>3</sub>O<sub>8</sub>, Au, Ag  
Gen Mgr: Martin Broshman  
Geol: Alex McHugh  
Under devel  
(See Utah)

### GYCLE CYCLE CORPORATION

Box 1028, Edgemont  
Res Asst Mgr: Edgar M Gillenwaters  
**GOULD LEASE**, 12 mi N of Edgemont,  
Fall River County, undergr, U<sub>3</sub>O<sub>8</sub>  
**FREEZEOUT MINE**, 20 mi NW of  
Edgemont, Fall River County, undergr,  
open pit, U<sub>3</sub>O<sub>8</sub>  
**TAYLOR MINE**, 25 mi NW of Edgemont,  
Fall River County, open pit, U<sub>3</sub>O<sub>8</sub>  
Gen Supt: Robert Rock  
(See Colo)

### HOMESTAKE MNG CO

Lusk  
**HOMESTAKE MINE**, undergr, Au  
Mgr: Black Hills Oper: James O Harder  
Mine Supt: K N Krawig  
Asst Mine Supt: W C Campbell  
Cl Geol: A L Slaughter  
Cl Mech Eng: LeRoy Seyhers  
Cl Met: C A Schmidt  
Ch Elect Eng: C L Gustafson  
Safety Eng: Phil Graves  
Purch Agt: F E Bryant  
Prod: 4,500 tons  
4,500-TON CYANIDE MILL, at mine  
(See Calif, Utah, Wyo)

### INGERSOLL MINE

Keystone  
Consult Mng & Met Eng: A J Johnson  
**MINE & MILL**, 2 mi NW of Keystone,  
undergr, open pit, pegmatite minerals

### INTERNAT'L MINERALS & CHEMICAL CORP

20 N Wacker Dr, Chicago 6, Ill  
Western Plants, Gen Supt:  
J W Mitchell, Keystone  
MINES, Custer, open pit, feldspar  
200-TON MILL, Custer, dry grinding  
Plant Supt: R H Brigham  
Mine Supt: A E Boone  
Mine Frm: Felix VanOverscheld  
**MINES**, Keystone, open pit, feldspar  
75-TON MILL, Keystone  
Mine Supt: A E Boone  
Mine Frm: Irven Green  
(See Ariz, Colo, Fla, Ill, Me, Miss,  
N Mex, N C, Ohio, Tenn, Va, Wyo)

### PETER LIEN & SONS

Box 1072, Rapid City  
Pres: Peter C Lien  
VP: Charles H Lien  
Sec-Treas: Bruce A Lien  
**QUARRY & KILN**, limestone  
Gen Supt: Robert Groethe  
Geol: Ray Smith  
Mine Supt: Al Johnson  
Elec Eng: Elmo More  
Prod: 1,000 tons

### LITHIUM CORP OF AMERICA INC

2500 Rand Tower, Minneapolis 2,  
Minn  
Pres: H W Rogers  
**MINES**, near Hill City, undergr,  
surface, Li  
Gen Mgr: John C Tailey, Sr  
**PLOT-MILL**, Hill City  
Supt: Carleton B Harris  
(See Minn, N C)

### LUTAH URANIUM & OIL, INC

746 Petroleum Bldg, Roswell,  
New Mexico  
Pres: Gordon E McMeen  
VP: Homer F Glover  
Sec-Treas: David J McKee  
**MCLEOD MINE**, Edgemont, open pl.,  
U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Gen Mgr: Harry Engman, Jr  
Asst Gen Mgr: Earl Long  
Under devel

### MAYWOOD CHEM WORKS

Hunter Ave, Maywood, N J  
**ETTA MINE**, Keystone, spodumene  
Mgr: Dewey Peterson

### McKENZIE GULCH MNG CORP

Box 400, Sturgis  
Pres: E G Brown  
VP & Gen Supt: Donald L Cammack  
Sec: J W Kowing  
Treas: Andy Wagner  
Purch Agt: Tom Wagner  
**MARIAN MINE**, open pit, U<sub>3</sub>O<sub>8</sub>  
Gen Mgr: Andy Wagner  
Asst Gen Mgr: Tom Wagner  
Under devel

### MINES DEVELOPMENT, INC

17 Gormers Union Bldg,  
Denver 3, Colo  
Exec VP & Gen Mgr: Allen D Gray  
Sec-Treas: W H Hoadley  
Prod Mgr: George T Bator  
400-TON MILL, Edgemont, Resin-in-  
pulp  
Mill Supt: H D Webb  
Mill Frm: C H Bryant  
Ch Chem: R P Stoker  
(See Colo)

### MINERALS MILLS, INC

Custer  
Pres: Albert Gushurst  
Sec & Gen Mgr: A J Johnson  
**GLENWOOD MINES**, 4 mi NW of  
Custer, mica  
Under devel

### MONTANA CHEMICAL & MILLING CORP

Box 1058, Edgemont  
Pres: James Weston  
VP: Wm J Kinick  
Sec: Isaac Melman  
Purch Agt: William Kinick  
**RUDA & DEXTER GROUP**, undergr  
Gen Mgr: M J Brown  
Asst Gen Mgr: E Read  
Mine Supt: Vernon Martin  
Prod: 100 tons  
(See Pictograph Mng & Uranium Co,  
Inc)

### PICTOGRAPH MNG & URANIUM CO, INC (Subsidi of MONTANA CHEM & MILL CORP)

Box 1058, Edgemont  
**RUNGE MINE**, U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Gen Mgr: Gerald C Mathis  
Mine Frm: Vernon Martin

### RIMROCK MNG CO, INC

Box 278, Sturgis  
Pres & Gen Mgr: W R Peregrine  
VP: Roswell Bottom  
Sec-Treas: R J Ray  
**RIMROCK MINE**, open pit, U<sub>3</sub>O<sub>8</sub>  
Under devel

### SCOTT'S ROSE QUARTZ CO

Custer  
Mgr: Frank S Scott  
**RED ROSE & MOUNTAIN ROSE**  
MINES, ne Custer, pegmatite  
minerals

### SODAK URANIUM & MMG CO, INC

Evans Hotel Annex, Hot Springs  
Pres & Gen Mgr: Clyde R Boyle  
VP: W E Haldane  
Sec: Paul Russell  
(See Wyo)

### SUNDANCE PETROLEUM & URANIUM CO

Box 293, Spearfish  
Pres: Howard H Holdcroft  
VP: Robert P Munger  
Sec: R G May  
Treas: Gaylord Smith  
(See Wyo)

## TENNESSEE

### AMER ZINC CO OF TENN (Subsidi of AMER ZINC, LEAD & SMELT CO)

Mascot  
VP: H A Cox  
Purch Agt: C C Sisk  
Mgr: W Black  
Gen Supt: M J Langley  
Supt of Mines: Harry L Miller  
Ch Eng: W N Johnson  
Ch Geol: Chas R L Oder  
Mech & Elec Supt: I D Campbell  
Personnel Dir: J L Allison  
Safety Eng: Harold Thompson

**Texas**

Aest Mine Supt: R L Brittain  
MASCOT NO 2 MINE, Mascot  
YOUNG MINE, Hodges Station  
NORTH FRIENDS STATION MINE,  
Hodges Station  
GRASSELLI, New Market  
COY MINE, Jefferson City  
ALL MINES, undergr., zinc, sulphide  
conc.  
4,000-TON FLOT-GRAV MILL, HMS,  
Jigs, Mascot  
Mill Supt: D H Grove  
Ch Chem: D E Chadwick  
(See Ariz., Ill., Mo., Ohio, Okla., Tex.,  
Wash., Wyo.)

**ARMOUR FERTILIZER**  
WORKS, INC.  
Columbia  
Supt: W B King  
PHOSPHATE MINE  
(See Fla.)

**B & T MNG CO**  
Box 659, Bristol  
Part: Harold D & E Tipton  
B & T MINE, Johnson County, open  
pit, Mo.  
Gen Supt: J R Sluder  
Prod: 10 tons

**COLUMBIA ROCK PROD.**  
CORP.

Pressnell Bldg, Columbia  
Pres: Wayne Pressnell  
VP: Harry Pressnell  
Sec-Treas: Wm C Fraser  
Purch Agt: W J Davis  
MINE, undergr., limestone  
Gen Mgr: Harry Pressnell  
Prod: 2,000 tons  
2,000-TON MILL, Columbia

**CONSOL HIGH GRADE ORE CO**  
Calhoun  
Parts: G S Murray, I B Murray,  
J D Murray  
MINE, Calhoun, open pit, Ba  
Mine Supt: Earl Sledge  
Under devel

**FELDSPAR CORP., THE**  
Spruce Pine, North Carolina  
FLOT MILL, Erwin  
(Subsidi of Pacific Tin Consol Corp.,  
NY)  
(See Ga., N.C.)

**FOOTE MINERAL CO.,**  
**ELECTRO MANGANESE DIV**  
1400 Loraine, Knoxville 1  
Div Act: Otto Neumann  
TWO PLANTS, Knoxville  
1323 Proctor Street  
1400 Loraine Street  
(See N.H., N.C., Pa., Va.)

**HARSH PHOSPHATE CO**  
760 Murfreesboro, Nashville 10  
Gen Mgr: M G Marsh  
Sec: T L Harsh  
MINE, 3 mi SE of Nashville, surface,  
ground, phosphate rock  
Prod: 125 tons

**HEAVY MINERALS CO**  
4000 N Hawthorne Ave, Chattanooga  
Pres: J C Ward, Jr  
VP: J M Frame  
Sec: K L Karr  
Treas: W W Stephen, Jr  
Gen Mgr: H C Laird  
(See Fla., S.C.)

**HIGHLAND MINING CORP**  
Centerville  
Pres & Gen Mgr: Bill Davis  
VP: D Brown  
Sec: M Brown  
HIGHLAND MINE, Centerville,  
surface, phosphate rock  
Prod: 700 tons

**INTERNAT'L MINERALS & CHEMICAL CORP**  
20 N Wacker Drive, Chicago 6, Ill  
CONSOL FELDSPAR DEPT., Erwin  
Prod Mgr: Charles Hunter  
Asst Prod Mgr: J R LeGrand  
Purch Agt: Paul Willis  
MICA PLANT, Erwin, dry grinding  
Gen Supt: J R LeGrand  
100-TON MICA FLOT PLANT,  
Greenville  
Gen Supt: Phil Thomas  
(See Ariz., Colo., Fla., Ill., Mo., Miss.,  
N Mex., N.C., Okla., S.D., Va., Wyo.)

**MONSANTO CHEM CO**  
Columbus  
MINE, 6 mi SW of Columbus, surface,  
dragline excav., phosphate  
Gen Mgr: J L Christian

Aast Gen Mgr: H F Weaver  
Purch Agt: E L Sandelin  
Mine Supt: H A Webster  
Asst Supt: J W Steenbergen  
Furnace Supt: R B Shaffner  
Mech Eng: W G Allen  
Elec Eng: R L Van Fossen  
Safety Eng: H E Coker  
Prod: 2,800 tons  
GRAV MILL  
ELEC FURN, 25,000-kw, yellow  
phosphorus  
(See Idaho, Mo.)

**NATIONAL LEAD CO**  
Sweetwater  
Mine & Mill Supt: J T Keim  
MINE, surface, barite  
MILL, washing, jugging, grinding  
(See Ark., Calif., Kans., La., Mo., Mont.,  
N.Y., Tex., Wyo.)

**NEW JERSEY ZINC CO**  
160 Front St, New York 38, N.Y.  
JEFFERSON CITY MINE, Jefferson  
City, undergr.  
Gen Supt: Tenn Oper: Johnson Craw-  
ford  
Supt: F H Main  
Mine Supt: A C Savage  
MILL  
Mill Supt: J E Nelson  
Asst Mill Supt: R E Daugherty  
FLAT GAP OPERATION, Treadaway  
Supt: R L Sayre  
(See Colo., N.J., N.Mex., N.Y., Pa., Va.,  
Wyo.)

**PRESSNELL PHOSPHATE CO.**  
INC

Pressnell Bldg, Columbia  
Pres: Wayne Pressnell  
VP: Harry Pressnell  
Sec-Treas: W J Davis  
Asst Sec-Treas: Wm C Fraser  
MINE, surface, phosphate  
Prod: 1,600 tons  
150-TON FLOT MILL, Columbia

**RIVER & RAIL PHOSPHATE**  
CO

135 2nd Ave N, Nashville  
Pres & Gen Mgr: L H Jordan  
Sec: S E Wheeler  
Gen Supt: Claude Warren  
MINE, 6 mi NW of Nashville, surface,  
dragline, raw phosphates  
Mine

PLANT, Jordonia, Tenn

**SOUTHERN MICA CO**

Johnson City  
Pres & Gen Mgr: C Bailey Rice  
VP: Martha R McClain  
Sec-Treas: B F McClain  
40-TON GRAV MILL, Johnson City  
Mill Supt: J F Reynolds  
Mill Frmn: Haskell Garland  
(See NC)

**TEXAS**

**HASH MINES**

408 Nash Blvd, Austin  
Own: J P Nash  
(See Ariz)

**NATIONAL LEAD CO., BAROID DIV**

Box 1075 Houston  
Gen Mgr: G B Coale  
Asst Gen Mgr: J W Hofstetter  
Asst to Gen Mgr: E J Hagsette, Jr  
H H Farnham  
Prod Mgr: Reginald Rowand  
CORPUS CHRISTI PLANT, barite,  
dry grinding mill  
Mill Supt: T A Stader  
HOUSTON PLANT, bentonite, barite,  
dry grinding mill, oil well cement  
Supt: R J Penrose  
MULDOON MINE, Muldoon  
bentonite, surface  
Supt: R J Penrose  
TEXARKANA PLANT, Texarkana,  
oil well cement, dry grinding  
(See Ark, Calif, Kans, La, Mo, Mont,  
N Y, Tenn, Wyo)

**NATIONAL LEAD CO., TEXAS MINING & SMELTING DIV**

Box 558, Laredo  
Mgr: J C Archibald, Jr  
Ch Chem: Fidel Gonzales  
Compt: Clark Norton  
REVERB & BLAST FURNACES,  
FUMING PLANT, Highway 81,  
N Laredo  
Plant Supt: R L Kulpaca  
(See Ark, Calif, Kans, La, Mo, Mont,  
N Y, Tenn, Wyo)

**PAN-AM MNG CO., INC**

Panhandle  
Pres & Gen Mgr: Clarence C Williams  
VP: C E Lyles  
Sec: E G Stapp  
Treas: Cyril Pingleton  
(See Ariz)

**PHELPS DODGE REFINING CORP** (Subsid of PHELPS DODGE CORP)

Box 1372, El Paso  
ELEC COPPER REFINERY, COPPER SULPHATE PLANT, also NiSO<sub>4</sub>, Be, Te  
Works Mgr: E W Donahue  
Asst Works Mgr: B B Kunkle  
Prod: 576,000 tons refined copper  
(See Ariz, N Mex, N Y)

**RARE METALS CORP OF AMERICA**

1st Security Bldg, Salt Lake City  
Il, Utah  
(Subsid of EL PASO STANOL, Box 1492,  
El Paso)  
Pres: C L Perkins  
VP & Asst Gen Mgr: M H Kline  
(See Ariz, Calif, Idaho, N Mex, Utah)

**RADIATION EXPLOR CO., INC**

Box 151, Henrietta  
Pres: C L Brownlow  
VP: James W Heath  
Sec: Paul Eggers  
TWIN RATTLER & CROWN MINES,  
Post, open pit, U<sub>3</sub>O<sub>8</sub>  
Gen Mgr: C L Brownlow

**SHEFFIELD STEEL COMPANY**

Box 3129, Houston  
MINES, Pa

**SOUTHWESTERN GRAPHITE CO**

Burnet  
Pres: George W Clemons  
VP: Robert P Miller, Sr  
VP & Gen Mgr: R P Miller, Jr  
Sec-Treas: Robert P Miller, Jr  
Supt: G E Hilliard  
Geol: D C Peacock  
Elec Eng: Geo Lockwood  
MINE, 11 mi NW of Burnet, surface  
graphite  
Mine Frm: Pete Bible  
Prod: 500 tons  
200-TON FLOT MILL, at mine  
Mill Frm: Tom McAllister  
Assay: James Wright

**SOUTHWESTERN PORTLAND CEMENT CO**

Box 303, El Paso  
MINE, Hudspeth County, gypsum

**SOUTHWESTERN TALC CORP**

Box 582, Llano  
Pres: Wm Negley  
VP & Sec: Clinton G Brown, Jr  
VP & Treas: Fred C Groce  
Asst Sec & Office Mgr: Tracy Ward  
MINE, Sierra Blanca, open pit,

**commercial talc**

Gen Mgr: J B Upton (Van Horn, Tex)  
Prod: 185 tons  
ROLLER MILLS, Llano  
Mill Supt: Albert Fox  
Cap: 100 tons of talc daily

**SUNRISE MNG CO**

708 Simon Bldg, Dallas, Texas

Pres: A P Simons

Res Mgr: G W Irvin

(See Ariz)

**SUPERIOR INDUSTRIES, INC**

309-11 Meadows Bldg, Dallas

Pres & Purch Agt: O T Ball

VP: W C Maxey

Sec-Treas: Inez Gibson

(See Ariz)

**TERLINGUA MERCURY CORP**

Jones Bldg or Box 390, Alpine

Pres: R N Pulliam

VP: Alexander H Cameron

Sec-Treas: J M Cameron

FRESNO, CAMP DE LOS ANGELES MINES, Terlingua, Quicksilver dist, undergr, Hg

Gen Mgr: R N Pulliam

Mine Frm: Jesus R Castillo

Under devel

**ROTARY FURNACE, at Fresno Mine**

Supt: L C Bradford

**TEXAS GULF SULPHUR CO**

New Gulf

Chmn of Bd: F M Nelson

Pres: C O Stephens

VP: Dr C F Fogarty

E F Van Der Stucken

E C Meagher

Purch Agt: R L Carter

BOLING MINE, New Gulf, S

MOSS BLUFF MINE, Liberty, S

SPINDLETOP MINE, Beaumont, S

undergr

Prod: 8,000 tons daily

(See N Y)

**TWIN STAR INDUSTRIES, INC**

111 S Congress T, Austin

Pres: W B Pratt

Exec VP & Treas: Leigh Ellis, Jr

VP: Mining: John C McNabb, Jr

VP, Sales: Warren Boaman

**WAH CHANG CORP**

235 Broadway, New York, N Y

TIN SMELTER, Texas City

(See Calif, Nev, N Y & E A Schulz & J H Casier, Ariz)

**UTAH****ALGONQUIN MINES**

418 Olive St, St Louis, Mo

Opn Part: Chas D Long

MINE, Lisbon Valley, San Juan

County, U<sub>3</sub>O<sub>8</sub>

Under devel

**ALHAMBRA CONSOLIDATED MINES, INC**

1903 Outpost Dr, Hollywood 38,

Calif

400 LODGE CLAIMS, Henry Mt dist,

Garfield County, U<sub>3</sub>O<sub>8</sub>

(See Calif, Nev)

**ALTA UNITED MINES CO**

Box 481, Salt Lake City

SOUTH HECLA MINE, Salt Lake

County, Ag, Pb, Zn

idle

**AMERICAN CONSOL MINES**

Salt Lake City

Pres: Henry Squires

Sec-Treas: W J Robertson

idle

**AMERICAN GILSONITE CO**

134 West Broadway, Salt Lake City

Pres: E F Goodner

VP: R E Nelson

Sec-Treas: E H Owen

Assy Prod Mgr: John M Baker

BONANZA MINES, Bonanza, undergr,

glaucite

Gen Supt: Paul Borden

Mine Frm: L F Williams

Min Eng: Richard Dewey

Prod: 900 tons

200-TON MILL, Bonanza, drying

& sizing plant

(See Colo)

**AMERICAN-SMELT & REFIN CO**

700 Crandall Bldg, Salt Lake City 1

**WESTERN DEPARTMENT**

Gen Mgr: W G Rouillard

Asst Gen Mgr: R L Hennebach

**Mining DEPT**

Mgr: J F Frost

Min Eng: Norman Weiss

**SMELTING DEPT**

Mgr: Kuno Doerr, Jr

Asst Mgr: E J McNalley

Acct Mgr: L K Nicholson, Jr

Or Buyer: J H Beyer

Supply Agt: C W Fredericksen

In Chg Acid & Liquid SO<sub>3</sub> Dept:

R D Williams

**GARFIELD COPPER SMELTER**

Garfield

Supt: R Thompson

Asst Supt: E V Hardy

Person Dir: C A Keyes

(See Ariz, Calif, Colo, Idaho, Ill, Kan, Md, Mont, Neb, N J, N Mex, N Y, Tex, Wash, and Federal Min

& Smelting Co, Mo)

**AMERICAN STAR MNG CO**

600 Dooly Bldg, Salt Lake City

Pres: Cecil Fitch

VP: Cecil Fitch, Jr

Sec-Treas: W W Watson

AMERICAN STAR MINE, Eureka, Ag, Au, Cu, Pb

idle

**AMPET CORP**

Colorado Bldg, Denver, Colo

Pres: R A Davis

Sec-Treas: Alfred O Brechner

MINES, San Juan, Emery, Grand

Counties, U<sub>3</sub>O<sub>8</sub> Prod

(See Ariz, Colo)

**ANACONDA CO, THE**

25 Broadway, New York 4, N Y

CARR FORK OPER: Bingham Canyon, Pb, Zn

Explor

(See subsid International Smelting & Refining Co, Ariz, Utah, and

Anaconda Company, Calif, Idaho, Mont, Nev, N Y, N Y)

**ANDERSON, W H**

430 E 1st North, Pleasant Grove

CLOUDBURST MINE, Utah County, Au, Ag, Pb, Cu

idle

**ARENTEZ COMSTOCK MNG VENTURE**

970 First Security Bldg, Salt Lake City

Pres: Samuel S Arentz (Managing Partner)

Treas: Frank H Anderson

(See Nev)

**ATOMIC RESOURCES CORP**

523 3rd NW, Albuquerque, N Mex

Pres: R E Reynolds

Treas: John R Less

WATERFALL GROUP, P O Box 458, Monticello, Dry Valley, undergr &

open pit, U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>

Gen Mgr: Carl Dismant

Prod: 100 tons

100-TON FLOT MILL, Dry Valley

**BALSLEY & BERRETT**

Moab

Partners: H W Balsley, Ray A

Berrett

SUNFLOWER & SNOWFLAKE MINES, San Juan County, U<sub>3</sub>O<sub>8</sub>

Under devel

**BAR X MNG CO**

155 E 2nd St, Salt Lake City

ESTHER GROUP, Tooele County, Ag, Pb, Zn

idle

**BARROS, RICHARD**

Box 504, Sunnyside

SILVER SPUR I, Emery County, open pit, Au, Cu

idle

**BEAR CREEK MINING CO**

181 42nd St, New York 11, N Y

MINE, East Titantic dist, Au, Ag, Cu, Pb, Zn

Under devel

(See N Y, Wash & Kennecott Copper Corp, N Y)

**BESTWALL GYPSUM CO**

120 E Lancaster Ave, Ardmore, Pa

GYPSUM MINE, Sigurd

(See Iowa, Kans, Mich, N Y, Pa, Tex)

**BIG HORN URANIUM CORP**

c/o Keith B Redd, Monticello

Pres: Alan Egbert

VP: Morris Nelson

Sec-Treas: Frank Hammond

Gen Mgr: Keith B Redd

LOST BOY MINE, White Canyon dist, undergr, U<sub>3</sub>O<sub>8</sub>

Mine Frm: Max Edgel

Edgel

**BINGHAM EMPIRE MNG CO**

P O Box 37, 135 N University, Provo

VP: Philip S Knight

Sec-Treas: Richard Knight

MINE, Bingham Canyon, 20 mi SW of Salt Lake City, undergr, Cu, Pb, Zn

Ag

U<sub>3</sub>O<sub>8</sub>

Illie

**BLACK BEAR CONS MNG CO**

186 N Canon Dr, Beverly Hills, Calif

Pres: Ralph S Reiner

Ult Agent: Merrill C Faux

MINE, Potts Fraction, Durkee dist, Platte County, U<sub>3</sub>O<sub>8</sub>

U<sub>3</sub>O<sub>8</sub>

Illie

**BLAKE & NIELSON**

Monticello, Utah

Partners: Donald V Blake,

Milton Nielsen

GISMO MINE, White Canyon dist, San Juan County, U<sub>3</sub>O<sub>8</sub>

U<sub>3</sub>O<sub>8</sub>

**BLUE GOOSE MNG CO**

Box 1055, Farmington, N Mex

LUCKY LADY CLAIMS, Circle Cliffs area, Garfield County, U<sub>3</sub>O<sub>8</sub>

Edie

**BLUE LIZARD MINES, INC**

26 W Broadway, Salt Lake City

Sec-Treas: B Leland Tanner

BLUE LIZARD MINE, Red Canyon dist, San Juan County, U<sub>3</sub>O<sub>8</sub>

Edie

**BONNEVILLE, LTD.**

540 W 7th South St, Salt Lake City 4

Chmn of Bd: W L Bradley

Pres: L W Ferris

Sec: G B C Mathison

Treas: Robert Livermore

Purch Agt: W R Thomas

MINE, Wendover, KCI

1,000-TON FLOT MILL

Gen Mgr: L W Ferris

Gen Supt: Jessie V Eaton

Asst Supt & Mill Frm: J Rands Wiley

Met: D C Hunter

Chemists: Clyde Andrew, Hal C Ballard

**BOYLES BROS DRILLING CO**

1321 S Main St, Salt Lake City

Pres: R T Goldsworthy

VP: H L Baker

Sec: A F Goldsworthy

Treas: W L Stevens

Purch Agt: A F Tacker

Comptroller: E D Haddon

**BRISTOL SILVER MINES CO**

210 Felt Bldg, Salt Lake City 1

Pres: George W Snyder

VP: Edward H Snyder

Sec-Treas: C M Christensen

(See Nev)

**BRITISH WESTERN AMERICA URANIUM CORP**

621 1st Security Bank Bldg, Salt Lake City

Pres: Henry Kyle

VP: George Barnes

Sec: I C Scott

(See Colo)

**BULLION MONARCH MNG CO**

## Utah

**CAPITAL-SEABOARD CORP**  
Box 1847, Farmington, N Mex  
Pres: Joseph H Corbin  
Exec VP & Gen Mgr: Chas W Yester  
Sec: Wm A Pope, Jr  
Treas: Howard L Corbin  
TAYLOR REID #1, 2, Ojai,  
San Juan County, undergr., U<sub>3</sub>O<sub>8</sub>,  
V<sub>2</sub>O<sub>5</sub>  
Mine Supt: James Donnini  
Prod: 15 tons  
(See Aris, Idaho, Moab, N Mex, Tex)

**CAPITOL URANIUM CO**  
Box 1847, Farmington, N Mex  
Pres: Warren E Wiley  
VP: Fred Carson  
Sec-Treas: William A Pope, Jr  
TAYLOR REID NO 1 MINE, Ojai,  
undergr., U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Mine Supt: Marshall J Fletcher  
Hire  
(See Aris, N Mex)

**CARDIFF MNG & MLG CO**  
Box 9006, Denver 16, Colo  
**CARDIFF MINE**, Salt Lake County,  
undergr., Ag, Pb, Zn  
Gen Mgr: A J Wondershak  
Geol: Gerald Fairchild  
Under devel

**CARISA MINING CO**  
P O Box 107, Marysville  
**CARISA MINE**, undergr., Au, Ag,  
Pb, Cu  
Own: Lucy Deluke  
Under devel

**CENTENNIAL DEVEL CO**  
Eureka  
Pres: Harold B Spencer  
VP: James Quigley  
Sec-Treas: Robert E Watt  
Ofc Mgr: Frank McCabe  
Fld Eng: E Steele McIntyre

**CHIEF CONSOL MNG CO**  
606 Dooly Bldg, Salt Lake City  
Pres & Gen Mgr: Cecil Finch, Jr  
VP & Sec-Treas: W W Watson  
**CHIEF NO 1, EAGLE, BLUE BELL,**  
PLUTUS MINES, Eureka, undergr.,  
Zn, Pb, Ag, Au  
Hire

**CHRISTINE MINES**  
Pres: Chris D Vye  
**HUMBUG MINE**, East Canyon dist,  
San Juan County, U<sub>3</sub>O<sub>8</sub>  
Under devel - some production

**CLIFF DEVEL & EXPLOR CORP**  
4445 Hyland Dr, Salt Lake City  
Pres & Gen Mgr: W C Dunham  
VP: Dolley Tanner  
Sec-Treas: Doris T Dunham  
**SHOWER'S MINE**, Silver City,  
undergr., Cu, Pb, Zn  
Under devel

**CLIMAX URANIUM CO**  
P O Box 1901, Grand Junction, Colo  
Pres: Frank Coolbaugh  
VP-Gen Mgr: A M Mirovich  
Consultant-Dir: E J Duggan  
Mgr of Mines: L J Brower  
Ch Geol: Philip Donnerstag  
Ass't Treas: R E Ellingberry  
Ass't Sec: T E Congdon  
**PROFIT MINE**, Monticello dist,  
San Juan County  
**MINERAL POLAR #22, CACTUS RAT,**  
CANE CREEK, Grand County, Utah  
U<sub>3</sub>O<sub>8</sub> bnd & development  
(See Aris, Colo, N Y)

**COG MINERALS CORP**  
Denver Club Bldg, Denver, Colo  
Pres: W C Norman  
VP: J H Nasen  
Treas: D F Taylor  
Purch Agt: Ed McDonald  
**SPOOK BULLSEYE & BASIN MINES**,  
Blanding dist, undergr., U<sub>3</sub>O<sub>8</sub>, Cu  
Gen Mgr: Ross V Seaton, Jr  
Geol: Clark Gregg  
Mine Supt: S K Bradford  
Mine Frmr: Homer Taylor  
Mine Eng: Skip Moore  
Prod: 140 tons  
**200-TON UPGRADE CONCENT MILL**,  
Fry Canyon

Mgr Min Div: Frank A Seaton  
Mill Supt: Homer Dale  
Mill Frmr: James Schlesberg  
Assay: William Rhodes

**COLORADO CONSOL MINES CO**  
1114 Walker Bank Bldg, Salt Lake  
City  
Pres: H E Raddatz  
VP: Harriet D Travis  
Sec: Glen Hardy  
Gen Mgr: M D Paine  
**COLORADO CONSOLIDATED MINE**,  
(Lessees) Dividend, 2 mi SE of  
Eureka, undergr., Pb, Au, Ag, Cu

**COLORADO FUEL & IRON CORP**  
Cedar City  
**BLOWOUT & COMSTOCK MINES**,  
Iron Mt, surface, Fe  
Res Eng: John Robertson, Jr  
Prod: 4,000 tons  
(See Colo, Wyo)

**COLUMBIA IRON MNG CO**  
(Subsid US STEEL CORP)  
120 Montgomery St, San Francisco,  
Calif

Pres: L B Worthington  
Exec VP: L J Westhaver  
VP-Oper: J D McCall  
Sec: D J McDaniel  
Mgr: Raw Mat Dev'l: R C Talbott  
Ch Eng: W F Pruden  
Dir, Ind Rel & Safety: C T Spivay  
Dir of Purch: M W Christensen  
MINES, Iron Mt & Desert Mountain  
20 mi W of Cedar City, surface, Fe  
Gen Supt: G D MacDonald  
Mine Eng: J D Quinn  
**CRUSHING & SCREENING PLANTS**,  
Desert Mountain & Iron Mt  
(See U S Steel, Alaska, Ala, Calif,  
Ky, Miss, Pa, Tenn, Utah, Wyo)

**COMBINED METALS REDUCTION CO**  
Box 150, Salt Lake City 10  
Pres & Gen Mgr: E H Snyder  
VP: H E Snyder, Jr  
VP Eng: W H Kelsey  
Treas: O F Burton  
Sec: C M Christensen  
Purch Agt: E G Black  
Gen Mgr: Paul Gemmill  
Ch Chem: H F Hansen  
Research Met: Corwin Likens  
Mech Eng: A L Schindler  
Ch Elec Eng: John M Ridges  
BAUER PLANT OPS: Stockton,  
Pb, Zn  
Gen Supt: C I Droubay  
Mine Supt: O D Cameron  
Mill Supt: Wimford Hector  
Met: Rex Hayes  
Master Mech: Kenneth Kihlstedt  
Office Mgr: Frank Andrews  
1200-TON FLAT MILL:  
Assayer: Kay Hanson  
HEIDI REFINERY  
(See Nev)

**COMMONWEALTH LEAD MNG CO**  
444 W Center St, Provo  
Pres: Orville J Cook  
VP: Royal B Garff  
Sec-Treas: L J Cook  
Geol: Peterstone  
Gen Mgr: Joseph W Neville, Jr  
**OPHIR MINE**, Stockton  
Elmer Mount

**COMMONWEALTH MNG CO OF S D**  
Box 892, Sioux Falls, S D  
**COMMONWEALTH URANIUM NO 1**  
& 2, near Greenriver & near Kanab,  
undergr., U<sub>3</sub>O<sub>8</sub>  
Gen Mgr: Dewey O Ferguson  
(Ouray, Colo)  
Hire

**COMSTOCK URANIUM & OIL CORP**  
211 Phillips Petroleum Bldg,  
Salt Lake City  
Pres: S A Walsh  
VP: Wm A Saar  
Sec: L K Nicholson, Jr  
Ass't Geol: J J Besson  
(See Nev)

**CONSOL EUREKA MNG CO**  
317 Kearns Bldg, Salt Lake City 1  
Pres: James E Hogle  
VP: J C Johnson  
Sec-Treas: L J Lerwill  
Gen Mgr & Purch Agt: Sherman B  
Kinckley  
(See Nev)

**CONTINENTAL MATERIALS CORP** (Formerly CONTINENTAL  
URANIUM, INC)  
P O Box 1550, Grand Junction, Colo  
Pres: Willard Gidwitz  
Sec: Max H Braze  
Bd Chmn: Gerald Gidwitz  
**CONTINENTAL NO 1**, LaSal, undergr.,  
U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Gen Supt: C H Reynolds  
Geol: H M Smithson, Gerald Brooke  
Met: C J Ternahan, Jr  
Min Supt: Clarence O Cox  
Prod: 100 tons  
(See Colo, Wyo & Woodmont, Inc, Utah)

**COPPER CANYON MINING CO**  
Box 307, Farmington, N Mex  
Treas: W G Marwaren  
Utah Agts: Senior & Senior, 10 Each  
Place, Salt Lake City  
**MITTEN NO 1 & MITTEN NO C-3**  
MINES, San Juan County  
U<sub>3</sub>O<sub>8</sub> Prod

**CULLEN MINERALS CORP**  
610 Rood Ave, Grand Junction,  
Colo  
Pres: Lucien H Cullen  
VP: K D Kaasch  
Sec-Treas: T M Tucker  
**ELIZABETH & FRISCO MINES**,  
Box 580, Monticello, undergr.,  
U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Gen Mgr: K D Kaasch  
Asst Gen Mgr: L G Peterson  
Gen Supt: Fred Zanett  
Mine Supt: Paul Alek  
Prod: 20 tons (Elizabeth)  
40 tons (Frisco)  
(See Colo)

**CULLEN-CAMPBELL IRON MINING CO**  
c/o Trust Dept, Continental Bank  
& Trust Co, Salt Lake City  
Trust Officer: W L O'Meara  
**CULLEN-CAMPBELL IRON MINE**,  
Iron Springs dist, Iron County

**CUPRIC MINES CO**  
29 Exchange Place, Room 29,  
Salt Lake City II  
Sec-Treas: David H Bulough  
NEWHOUSE-CACTUS MINE, San  
Francisco dist, Beaver County,  
open pit development, Cu

**CURTIS URANIUM MINES**  
625 N 7th W, Provo  
Own: M Curtis  
6 CLAIMS, SE of Circlo, undergr.  
open pit, U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
idle

**DRAGON CONSOL MNG CO**  
c/o Rom Warburton, 818 Kearns  
Bldg, Salt Lake City  
Pres: J Will Knight  
VP: J J Lillie  
Sec: Rom Warburton  
Geol: M B Kilbahn  
Purch Agt: T K Davis  
**DRAGON MINE**, 4 mi S of Eureka,  
undergr. & surface, halloysite clay,  
An  
Lessee: Filtral, Inc, Salt Lake City

**EAGLE & BLUE BELL MNG CO**  
606 Dooly Bldg, Salt Lake City  
Pres: Robert E Watt  
Sec-Treas: Audrey L Christenson  
**EAGLE & BLUE BELL MINES**, Juab  
County, Au, Ag, Cu, Pb, Zn  
Hire

**EAST UTAH MINING CO**  
Dry Valley  
**BLUE ROCK MINE**, 20 mi NE of  
Pleasant Grove, undergr., Ag, Pb, Au  
**EL DORADO MNG CO**  
816 Newhouse Bldg, Salt Lake City  
Pres & Gen Mgr: Whitney C Hansen  
VP: Sherman Jensen

Sec: Alvin G Pack  
Treas: Ivin O Nichols  
CLAIMS, North Bingham, Indian  
Creek, San Juan County & Nodom  
Bench, Garfield County, undergr.,  
U<sub>3</sub>O<sub>8</sub>  
Under devel

**EL DORADO MINE**, Salt Lake County,  
undergr., Ag, Au, Pb, Zn  
Geol: H E Havenor  
Supt: George Rhodes  
Idle

**EL OPAL MNG**  
Box 1109, Moab  
Pres: Donald F Lenox  
VP: Floyd Lenox  
Sec: Mrs D F Lenox  
YELLOW CIRCLE NO 151 MINE,  
undergr., U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Mine Frmr: Shorty Begay  
Prod: 12 tons  
**BEFF BASIN GROUP**  
Under devel

**EMPIRE MINES CO**  
818 Kearns Bldg, Salt Lake City  
SPY & BLACK JACK MINES, Juab  
County, Au, Ag, Cu

**EUREKA LILLY CONS MNG CO**  
1114 Walker Bank Bldg, Salt  
Lake City I  
Pres: H E Raddatz  
VP: Harriet D Travis  
Sec: Glen Hardy  
Gen Mgr: M D Paine  
**EUREKA LILLY MINE**, Dividend,  
undergr., Au, Ag, Cu, Pb  
Idle

**EUREKA STANDARD CONSOL MNG CO**  
1114 Walker Bank Bldg,  
Salt Lake City  
Pres: H E Raddatz  
VP: Harriet D Travis  
Sec: Glen Hardy  
Treas-Purch Agt: M D Paine  
**EUREKA STANDARD & DUMP MINES**,  
Utah County, Au  
Idle

**EVEN ODDS, INC**  
Box 12, Monticello  
Pres: James L Menlove  
VP: Bonnie L Dalton  
Sec: Melvin K Dahl, ton  
Treas: Joan D Menlove  
PETE & LEE MINES, undergr.,  
U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Gen Mgr: Carl Mahon  
Prod: 25 tons

**EXCALIBUR URANIUM CORP**  
Box 1201, Santa Fe, New Mexico  
Treas: Zane E Henderson  
COTTONWOOD #6 MINE, Green  
River Dist, Emery County, U<sub>3</sub>O<sub>8</sub>  
Under devel

**FAIRWAY URANIUM CORP**  
2320 S Main St, Salt Lake City  
Pres & Gen Mgr: O C Larson  
Sec: Kenneth Taylor  
Idle

**FEDERAL URANIUM CORP**  
P O Box 1317, 245 S Main St,  
Salt Lake City  
Pres: R W Neyman  
VP: Lester S Harrison  
Sec-Treas: C Allen Eigrén  
Purch Agt: Grant F McGowan  
VARIOUS MINES, U<sub>3</sub>O<sub>8</sub>, Ag, Pb,  
Zn, Cu  
Gen Supt: Lee Messerly  
Geol: Raymond Lindlof  
Met: Arthur Griffiths  
Mech Eng: Joe V MacGuffie  
(See N Mex)

**FISHER, O L & ASSOCIATES**  
P O Box 82, Morgan St, Modena  
Leasee-Op: O L Bill Fisher  
THE OPHIR MINE, Modena, 21 mi  
N at Old State Line dist, undergr.,  
U<sub>3</sub>O<sub>8</sub>, Au, Ag, Cu  
Under devel

## Utah

**FIVE STATES URANIUM CO**  
Simms Bldg, Albuquerque, N Mex  
**DIRTY DEVIL CLAIM**, Emery  
County, U<sub>3</sub>O<sub>8</sub>  
**CLAIMS**, Tomisch Mountain, Emery  
County, U<sub>3</sub>O<sub>8</sub>  
Mine

**FOUR CORNERS URANIUM  
CORP**  
P O Box 1749, Grand Junction  
VP: Edward L Clark  
**GREEN RIVER GROUP (9 MINES)**  
Green River, U<sub>3</sub>O<sub>8</sub>  
Gen Mgr: W R Bronson, Monticello,  
(See Colo, Wyo)

**FRISCO SILVER LEAD MNG  
CO**  
39 Exchange Place, Salt Lake City  
Pres: Paul H Hunt  
Sec: David H Bullough  
MINE, 25 mi W of Milford, undergr.  
U<sub>3</sub>O<sub>8</sub>

**GARFIELD CHEMICAL &  
MFG CORP**  
700 Crandall Bldg, Salt Lake City  
Pres: Kuno Doerr, Jr  
VP: L F Pett, F C Green  
Sec-Treas: L K Nicholson, Jr  
Purch Agt: C W Frederiksen  
1,000-TON SULPHURIC ACID PLANT  
Garfield  
Mgr, Acid & Liquid SO<sub>2</sub> Dept:  
R D Williams  
Supt: A S Neslen

**GERONIMO URANIUM MNG**  
345 S State St, Salt Lake City  
Mine Coal

**GLENNY-CUTLER**  
704 Newhouse Bldg, Salt Lake City  
MINES, Various operations in San  
Rafael and Temple Mtn districts,  
Emery County, U<sub>3</sub>O<sub>8</sub>

**GOLDEN CYCLE CORP., THE**  
P O Box 86, Carlton Bldg,  
Colorado Springs, Colo  
MINE, Marysville  
Supt: Maurice Castagne  
(See Colo)

**GRAMLICH EXPLOR CO**  
Box 435, Moab  
Pres & Gen Mgr: J W Gramlich, Sr  
VP & Asst Gen Mgr: J W Gramlich, Jr  
Sec-Treas & Gen Supt: Philip F  
Gramlich  
BLUE JAY & SAN JUAN MINES,  
undergr., U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Geol: Duff Ebbey  
Mine Eng: Hub Newell

**GRAND DEPOSIT MNG CO**  
409 Ness Bldg, Salt Lake City I  
Pres: Paul C Lyon  
VP: Walter J Eldridge  
Sec & Gen Supt: Paul C Lyon, Jr  
(See Nev)

**GREAT FRONTIER MNG CO**  
647 Glenwood Ave, Grand Junction,  
Colo  
Mgr: S P Clayborn  
CEDAR POINT MINE, Gateway dist,  
Grand County  
U<sub>3</sub>O<sub>8</sub> Prod

**GREAT WESTERN MINES CO**  
P O Box 31, Provo  
Pres & Gen Mgr: Richard Knight  
VP: W S Brimhall  
Sec-Treas: Philip S Knight  
40 CLAIMS, Snake Creek dist,  
American Fork Mng dist, undergr.,  
Cu, Au, Ag, Pb  
(Under lease to New Park Mng Co)  
Under devel

**GREEN HORN SILVER MNG  
CO**  
P O Box 107, Maryvale  
Own: Louis C Deluke  
MINE, Maryvale, undergr., Pb,  
Zn, Au, Ag, Cu  
Mine

**GREEN RIVER OIL &  
URANIUM CO**  
26 W Broadway, Salt Lake City  
Pres: Falas M Kelly  
Sec-Treas: Austin B Smith  
(See Colo, Wyo)

**HALDANE & JONSON MNG  
CO**  
1037 Ouray Ave, Grand Junction,  
Colo  
Partners: W E Haldane, O E Jonson  
**PROFIT MINE**, East Canyon, San  
Juan County, undergr., U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>

**HALL, BAILEY & NIELSON**  
Monticello,  
Partners: E J Hall, R E Bailey, Jr,  
Milton Nielsen  
**MAYBE MINE**, WHITE CANYON MINE,  
San Juan County.  
U<sub>3</sub>O<sub>8</sub> Prod

**HAMILTON, TANNER & LOHSE**  
Box 885, Kirtland, N Mex  
Pres: Gene Hamilton  
VP & Purch Agt: Lynn C Tanner  
Sec: Vernon Lohse  
**JASPER & AGATE MINES**, Fry Canyon,  
undergr., U<sub>3</sub>O<sub>8</sub>, Cu  
Geo: A C Tanguay  
Under devel

**HAMPTON MNG CO**  
c/o Stanford R Mahoney,  
502 Atlas Bldg, Salt Lake City  
**SILVER EAGLE MINE**, Tooele  
County, Ag, Pb, Zn  
Mine

**HARRINGTON MINES CO**  
c/o Jack Hanley, Jr, Milford  
**HARRINGTON-HICKORY GROUP**,  
Ag, Pb, Zn  
Idle

**HECLA MNG CO**  
Muab  
Pres: L J Randall  
Mgr of Mines: W H Love  
**RADON MINE**, Big Indian dist,  
near Moab, undergr., U<sub>3</sub>O<sub>8</sub>  
Mine Supt: Philip Lindstrom  
Mine Frm: Grant Estlick  
Mine Eng: Vernon Davis  
Prod: 250 tons  
(See Idaho)

**HIDDEN RAINBOW URANIUM  
CO**  
3841 L A Hi-way, Las Vegas, Nev  
Gen Mgr & Own: Joseph A LaBarber  
MINE, Emery County, undergr.  
Asst Gen Mgr: James Gordon  
Geo: Francis Frederick  
Met: Merrill MacAfee  
Mine Supt: James Gordon  
Mine Frm: Wells Noyes  
Under devel

**HIDDEN SPLENDOR MNG CO,  
THE**  
First Security Bldg, Salt Lake City

Pres: A Payne Kibbe  
VP & Gen Mgr: Dale J Hayes  
VP: David A Stretch  
Sec-Treas: Edward R Farley, Jr  
Purch Agt: Jack E Hopfenbeck  
Gen Cons Eng: Otto D Rohlis, Jr  
Gen Supt: Kenneth A Hobbs  
Asst Gen Supt: Ray L Schultze  
Ch Eng: William B Loring  
Ch Eng: E T Wood  
**DELTA MINE**, Muddy River, Emery  
County, undergr., U<sub>3</sub>O<sub>8</sub>  
Idle

**PAK WEST**, Big Indian Wash, San  
Juan County, undergr., U<sub>3</sub>O<sub>8</sub>  
Mine Supt: John R Mullen  
Mine Frm: Albert P Edwards  
Prod: 15,000 tons  
**COLUMBIA SHAFT**, undergr., U<sub>3</sub>O<sub>8</sub>  
Mine Supt: Harry S Poller  
Prod: 2,500 tons  
**IKE SHAFT**, undergr., U<sub>3</sub>O<sub>8</sub>  
Mine Frm: Lynn D Barry  
Prod: 3,700 tons  
(Subsidiary of Atlas Corp)

**HOMESTAKE MNG CO,  
UTAH DIV**  
100 Bush St, San Francisco, Calif  
**NORTH ALICE MINE**, Big Indian

dist, San Juan County, undergr., U<sub>3</sub>O<sub>8</sub>  
Gen Supt: Gordon M Miner  
Asst Supt of Mines: Edw F Jacobson  
Mine Frm: Jefferson Taylor  
Eng: Walt Weid  
(See Calif, N Mex, S D, Wyo)

**HORN SILVER MINES CO**  
39 Exchange Place, Salt Lake City  
Pres: P H Hunt  
Sec-Treas: D H Bullough  
**HORN SILVER MINE**, Milford, Au,  
Ag, Pb, Zn  
Idle

**HORSETHIEF CANYON  
URANIUM INC**  
930 E 3rd S, Salt Lake City  
Pres: Chester M Peters  
VP: James L Knowlden  
Sec: Jessie M Peters  
Treas: Eugene Moench  
**HORSETHIEF CANYON MINE**,  
Green River area, undergr., U<sub>3</sub>O<sub>8</sub>,  
V<sub>2</sub>O<sub>5</sub>  
Gen Mgr: C M F Peters,  
Idle

**HOWE SOUND COMPANY**  
238 North 21st West, Salt Lake  
City 18  
Pres: E C Roper  
VP: W M Fassell, Jr  
Treas: W L Holmes  
Purch Agt: J W Farnsworth  
(See Idaho & Calera Mng Co, Idaho, Utah)

**HUNT, KAY**  
Kanksville  
**KING GROUP**, undergr., open pit,  
U<sub>3</sub>O<sub>8</sub>  
Prod: 5 tons  
**BLUE BIRD GROUP**, undergr., open  
pit,  
Mine Frm: Raymond C Harvey  
Prod: 10 tons

**HUNT OIL CO**  
Grand Junction, Colo  
**DRILLING**, La Sal Creek, U<sub>3</sub>O<sub>8</sub>  
Under devel  
**THORNBURG LEASE**, U<sub>3</sub>O<sub>8</sub>  
Idle

(See Idaho)

**HUNT URANIUM CORP**  
Hawkinsville  
Pres: Andrew Hunt  
VP & Gen Mgr: Kay Hunt  
Sec & Geol: Rio Hunt  
Treas & Ass't Mine Supt: Loyd Hunt  
**Poison Springs Mine**, undergr.,  
U<sub>3</sub>O<sub>8</sub>, Cu  
Idle

**HYPOTHEEK MNG & MLG  
CO**  
510 Bank St, Wallace, Idaho  
**CLAIMS**, U<sub>3</sub>O<sub>8</sub>  
Idle

(See Idaho, Mont)

**IBEX GOLD MINING CO**  
135 N University Ave, Box 37,  
Pres  
VP: Philip S Knight  
Sec-Treas & Gen Mgr: Richard Knight  
**IBEX MINE**, (Leased), near Delta,  
in Drum Mt dist, undergr., Cu, Au,  
Ag  
Prod: 6 tons

**INDEX-DALEY MINES CO**  
118 N Main St, Salt Lake City  
Pres & Gen Mgr: Charles S Woodward  
VP: Glen A Finlayson  
Sec-Treas: R W Edmunds  
(See Nev)

**INDIAN CREEK URANIUM  
& OIL CORP**  
2320 S Main St, Salt Lake City  
Pres: O C Larson  
VP: Kenneth Taylor  
Sec: Preston W Frame  
Treas: D W Richards, Jr  
Purch Agt: O C Larson  
**BONANZA-CUTLER MINE**,  
Monticello, undergr., U<sub>3</sub>O<sub>8</sub>

Gen Mgr: O C Larson  
Supt: L W Reiter  
Geol: Geo E Fulliotte  
Idle

**INDUSTRIAL URANIUM CO**  
273 So Main, Salt Lake City  
Pres: Robert M Schuback  
VP in Chg of Oper: Robert G Harding  
Sec-Treas: Willard M Burton  
**MOONLIGHT, STARLIGHT & SUN-**  
**LIGHT MINES**, P O Box 428, Mexican  
Hat, undergr., U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>, Cu  
Asst Gen Mgr: C R Ranney  
Gen Supt: John Borkert  
Prod: 300 tons

**INDUSTRIES & MINES INC**  
85 Broad St, New York 4, NY  
**DEL MONTE, DAISY JUEN, CON-**  
**GRESS, EAGLES & CHIEF MINES**,  
Henry Mts, undergr. & surface,  
U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>, Au, Cd, Ta  
Gen Mgr: James M Knapp  
Asst Gen Mgr: Edward Honoka  
Geol: Stuart S Claar  
Mech Eng: Wm Kessen  
Prod: 1,500 tons & developing  
(See N Y)

**INTERNAT'L SMELTING &  
REFINING CO**  
Kearny Bldg, Salt Lake City 1  
Ch Geol: M B Kidde  
Purch Agt: M B Davis  
Cashier: Rom Warburton  
Traffic Mgr: Marvin J Mortensen  
Counsel: Robert D Dwyer  
Ore Buyer: Glen A Bell  
Mgr, Tooele Plt Oper: W J McKenna  
Gen Supt: E W Steinbach  
Personnel & Safety: T K Voyer  
Ch Elec: Harry Gillespie

**INSPIRATION LEAD CO, INC**  
P O Box 178, W 808 Sprague Ave,  
Spokane 10, Wash  
**PROPERTIES**, Brumley Ridge, E of  
Moab, Grand County, U<sub>3</sub>O<sub>8</sub>  
**CLAIMS**, W of Blanding, Big Indian  
dist, San Juan County, U<sub>3</sub>O<sub>8</sub>  
Explor  
(See Idaho)

**ISABELL CONST CO**  
Box 2381, Reno, Nev  
**HAPPY JACK URANIUM MINE**,  
Fry Canyon, contract mng for Texas-  
Zinc Minerals Corp  
Supt: Dick Strand  
(See Ariz, Idaho, Nev, Wash)

**JEN, INC**  
Maah  
Chm of Bd: E H Snyder  
Pres: C E Tuttle  
VP: E H Snyder, Jr  
Sec-Treas: C M Christenson  
Mine Mgr: George Teal  
**MINE**, E L Cord Properties, Big  
Indian dist, San Juan County  
U<sub>3</sub>O<sub>8</sub> Prod

**JOINT VENTURES EXPLOR**  
P O Box 42, Moab  
Own: M Smith, K Allred, W Shape  
Sec-Treas: Marlowe Smith  
**AT LAST MINE**, undergr., open pit,  
U<sub>3</sub>O<sub>8</sub>  
Prod: 6 tons

**JOLLY JACK URANIUM**  
623 Judge Bldg, Salt Lake City  
**PROPERTIES**, White Canyon area,  
Big Indian dist & Garfield County,  
U<sub>3</sub>O<sub>8</sub>  
Mine Supt: Vernon R Ailes

**KENNECOTT COPPER CORP.,  
UTAH COPPER DIV**  
P O Box 1650, Salt Lake City 13  
Gen Mgr, Utah Copper Div: L F Pett  
Asst Gen Mgr, Utah Copper Div:  
F C Green  
Gen Supt of Oper, Utah Copper Div:  
J C Landenberger  
Dir, Indus Rel: E C Simkins  
Dir, Communications: D C Houston  
Dir, Safety & Fire Control:  
E K Olson  
Dir, Pub Rel: N W Aldrich

**Utah**

Div Comptroller: J P O'Keefe  
 Asst Div Compt: G C Madsen  
 Ch Eng: A J Thill, Jr  
 Ch Mine Acct: S W Jacques  
 Ch Mill Acct: C R Brooks  
 Storekeeper, Mill: G H Kavanagh  
 Storekeeper, Mine: A J Boberg  
 Ch Refinery Acct: H L Erickson  
 Ch Eng Ref: R F Anderson  
 Master Mech, Mine: S A Godmundsen  
 Gen Master Mech, Mills: L Baldee  
 Master Mech, Magna: W L Hendrickson  
 Master Mech, Arthur: J W Ledingham  
 Traffic Mgr: A L Pratt  
 CENTRAL POWER STATION, Garfield  
 Ch Eng: J H Hardin  
 MILLS ORE HAULAGE, Garfield  
 Sup't L S Hills  
 BINGHAM MINE, Bingham Canyon, Cu  
 Mine Sup't: V S Barlow  
 Asst Mine Sup't: J A Norden, Jr  
 Ray F Gough  
 Employment Dir: L O Hamlin  
 Safety Eng: Rose Pino  
 MAGNA & ARTHUR MILLS, Garfield  
 Gen Sup't: F H Ensign  
 Sup't, Magna: T J Hubbard  
 Sup't, Arthur: C G Quigley  
 Asst Sup't, Magna: T J Barker, Jr  
 Employment Dir: M A Moffat  
 Ch Elec Eng: R J Corfield  
 Safety Eng: R L Erickson  
 Ch Met Eng: A G Johnson  
 Ch Anal Chem: V A Fraser  
 UTAH REFINERY, Garfield  
 Sup't: H A Shaw  
 Asst Sup't: K H Korrop  
 Met Eng: C A Zeldin  
 Plant Elect: F G Salisbury  
 Master Mech: R F Johnson  
 GANFIELD WATER & IMPROVEMENT CO, Garfield  
 Sup't: C R Taylor  
 (See Ariz., Nev., N Mex., N Y & Bear Creek Mng., Utah)

KENO MNG & MLG CO  
 135 N University Ave, Box 37  
 Pres  
 VP: Philip S Knight  
 Sec-Treas & Gen Mgr: Richard Knight  
 IDEX MINE (Leased), Detroit Mng dist, north end of Mineral Mt range, undergr, Ag, Pb  
 Idle

KERN COUNTY LAND CO  
 Newhouse Bldg, Salt Lake City  
 Pres: George Montgomery  
 VP, Oil & Minerals: H L Reid  
 Ch Geol: Wm Griswold  
 Explor  
 (See Calif.)

KNAPP URANIUM DEVEL  
 555 E 5600 S, Salt Lake City  
 Pres: Clyde J Knapp  
 (Mines leased out)

LAKESIDE-VANURA JOINT VENTURE  
 Marshall Court, Moab  
 Agt: Ellie R Cook, Jr  
 ALLEN #2 MINE, Approx 20 mi W of Blanding, undergr, U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>, Cu  
 Gen Sup't: Everett Blackburn  
 Lessee: Virgil Allen  
 Prod: 20 tons  
 Under dev'l

LA SAL MNG & DEVEL CO  
 Box 565, Moab  
 LA SAL MINE, Big Indian dist, San Juan County, undergr, U<sub>3</sub>O<sub>8</sub>  
 Sup't: Gordon Miner  
 Pres: Donald Weierman  
 Mine Eng: Walt Weid  
 Prod: 216 tons

LA SHUBERCO MNG CO  
 Box 303, Marshfield, Wis  
 Pres: Grant Johnson  
 VP: W W Mittelstaedt  
 Sec: Fred Wolf  
 Treas: Dan Hosek  
 LITTLE EVA MINE, Yellow Cat dist, Grand County, undergr, U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>

LEWIS, E B & ASSOCIATES  
 Box 1849, Grand Junction, Colo  
 Agent: D M Duckett

BLACK STONE MINE, Yellow Cat dist, Grand County, U<sub>3</sub>O<sub>8</sub>  
 Under devel - some production

LISBON URANIUM CORP  
 304 First Security Bldg, Salt Lake City  
 Pres: A P Kirby  
 VP: Eric C Ryberg  
 Sec: Max B Lewis  
 Treas: Glen L Davis  
 I&E & NIXON CLAIMS, Big Indian dist, U<sub>3</sub>O<sub>8</sub>  
 JULY LEE & PATTI ANN CLAIMS, 1 mi N of Ike & Nixon Claims, U<sub>3</sub>O<sub>8</sub>  
 Geol: Harold W Blakely  
 (See Mont., Colo., Wyo., N Mex)

LISBON VALLEY URANIUM CORP  
 501 Kittridge Bldg, Denver, Colo  
 MASSEY & "C" GROUP MINES, Colorado-River area, San Juan County, U<sub>3</sub>O<sub>8</sub>

LITTLE BEAVER MNG CO, INC

Box 583, Moab  
 Pres: Donald H McLaughlin  
 LITTLE BEAVER MINE, Big Indian dist, San Juan County, undergr; U<sub>3</sub>O<sub>8</sub>  
 Gen Mgr & Mine Sup't: G M Miner  
 Ass't Mine Sup't: Ed F Jacobson, Jr  
 Frmr: Frank Boeskie  
 Mine Eng: Walt Weid  
 Prod: 100 tons

LONE STAR MINING & DEVELOPMENT CORP  
 235 Korber Bldg, Albuquerque, New Mexico  
 Pres: W L Davidson  
 BUTLER WASH & JACKPOT MINES, Monticello dist, San Juan County  
 NORTH WASH #1, Henry Mtn dist, Garfield County, U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
 Prod: 20 tons  
 (See N Mex)

MAGNUS INTERNATIONAL CORP (Formerly Malco Explor Co, Inc)  
 P O Box 30, Los Alamos, N Mex  
 MAGNUS NO 1 & 2, Castle Dale, undergr, U<sub>3</sub>O<sub>8</sub>  
 Mine Frmr: A P Pritchett  
 Prod: 23 tons  
 OTHER PROPERTIES  
 BIG INDIAN WASH, San Juan County  
 SAN RAFAEL SWELL, Emery County  
 (See Colo., N Mex)

MAMMOTH MNG CO  
 Mammoth  
 Mgr: E S McIntyre  
 MAMMOTH MINE, Tintic dist, Juab County, Au, Ag, Cu, Pb

MARCY-SHENANDOAH CORP  
 Jarvis Bldg, Durango, Colo  
 Pres: S Stokes Tomlin, Jr  
 VP & Geol: E M Barge  
 Sec: R M Schell  
 Treas: Robert R Snodgrass  
 Purch Agt: Edwin A Larson  
 NOTCH NO 4 MINE, W of Blanding, undergr, U<sub>3</sub>O<sub>8</sub>  
 Geol Mgr: W G Sandell  
 Ch Eng: Irwin A Andrews  
 Mine Sup't: Maurice Helquist  
 Ass't Mine Sup't: Phil Hawkins  
 Prod: 15 tons  
 (See Ariz., Colo)

MASCOT MINES, INC  
 Box 989, Kellogg, Idaho  
 Pres: Malcolm C Brown  
 VP & Purch Agt: Cumham Bell  
 Sec-Treas: H F Magnuson  
 COLORADO RIVER MINE, Box 985, Moab, Hatch Point, San Juan County, undergr, U<sub>3</sub>O<sub>8</sub>  
 Gen Mgr: Claude Nugent  
 Mine Sup't: Inar Norgaard  
 Idle  
 (See Idaho)

Mc FARLAND & HULLINGER  
 Box 238, Tooele  
 Partners: F G McFarland,  
 S R Hullinger

OPHIR UNIT, Tooele County, Zn  
 MAYBE MINE, White Canyon dist, San Juan County, U<sub>3</sub>O<sub>8</sub>  
 (See Ariz.)

MEDICINE BOW URANIUM CO, INC  
 2124 20th East, Salt Lake City 6  
 Pres & Gen Mgr: J B Ferre  
 VP: James B Potter  
 Sec-Treas: Lionel J Bradford  
 (See Wyo)

METAL QUEEN MNG CORP  
 c/o E C Berry, Box 804  
 Grantsville  
 Pres: E C Berry  
 VP: C D Bennett  
 Sec: S B Hagen  
 METAL QUEEN GROUP, Tooele County, Au, Pb, Zn, Hg  
 Geol: N B Crawford  
 Under devel

MICHIGAN UTAH CONSOL MINES CO  
 417 Beacon Bldg, Salt Lake City 1  
 Pres: De Witt Van Evera  
 Sec-Treas: Rynier Van Evera

MID CONTINENT URANIUM  
 204 Uranium Center Bldg, Grand Junction, Colo  
 JOHN INCLINE MINE, Thompson, Yellow Cat dist, Grand County, U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub> (Leased to Longfoot H Wilkerson, P O Box 3, Thompson)  
 Prod: 5 tons  
 (See Colo., N Mex)

MINERAL MNG CO, INC  
 Box 361, Blanding  
 CHANNEL MINE, Red Canyon, White Canyon dist, San Juan County, undergr, U<sub>3</sub>O<sub>8</sub>, Cu  
 Gen Mgr & Sup't: Bill Franklin  
 Ass't Mgr & Sup't: Clarke P Yaeger  
 Geol & Eng: Wm H Greer  
 Trans: Robert Skaggs  
 Prod: 100 to 200 tons  
 RED BOX MINE, Ferronville, Fry Canyon, U<sub>3</sub>O<sub>8</sub>, Cu  
 Id  
 Gen Mgr: Kenneth L Franzen  
 Sup't: Willard Edwards  
 Eng: Wm H Greer

MINERALS ENGR CO  
 801 4th Ave, Grand Junction, Colo  
 CHEM REFINERY, Salt Lake City  
 Mgr: Blair T Burwell  
 Output: 2,760,000 lbs yrly  
 (See Colo., Mont)

MOAB DRILLING CO  
 512 E Central St, Moab  
 Pres: Charles Steen  
 Gen Mgr: William H Lewis  
 DIAMOND DRILLING

MOKI MINING CO  
 Phillips Petroleum Bldg, Salt Lake City  
 Agent: Henry H Kyle  
 MOKI NO 1 & MOKE NO 2 MINES, Monticello dist, San Juan County, U<sub>3</sub>O<sub>8</sub>

MONOGRAM URANIUM & OIL CO  
 805 Petroleum Bldg, Grand Junction, Colo  
 Pres: Ray Baxter  
 VP-Sec & Treas: Howard

MONOGRAM URANIUM & OIL CO  
 805 Petroleum Bldg, Grand Junction, Colo  
 Pres: Ray Baxter  
 VP: Howard F Carr  
 Sec-Treas: Geo Dilts  
 DESERT MOON MINE, Green River, undergr, U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
 Mine Sup't: Joseph N Trudeau  
 Prod: 35 tons  
 (See Colo.)

MONTE CRISTO URANIUM CORP  
 1101 Continental Bank Bldg,

Salt Lake City  
 Pres & Treas: Richard Minasian  
 VP: Dennis Neilson  
 Sec: Clarence C Nealen  
 HONEY BEE I & 2 MINES, Cave Springs Canyon, San Juan County, undergr, U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
 (Oper under lease by the Skidmore Mng Co of Dolores, Colo)

MOUNTAIN MINERALS INVEST CO  
 Congress Hotel, 2nd S & State, Salt Lake City  
 Pres: Donald Gilman  
 VP: Richard Hunt  
 Sec-Treas: Marie K Reeves  
 POCO SUENO MINE & HIDDEN TREASURE, Tooele County, Ag, Pb, Zn, Au, Cu  
 Mine Sup't: George Patrick  
 Prod: 30 tons  
 30-TON GRAV MILL, Gold Hill  
 Mill Sup't: Luman Gilman

MOUNTAIN VIEW MNG CO  
 612 Kearns Bldg, Salt Lake City 1  
 MT VIEW GROUP (MAY DAY & HUMBUG), Au, Ag, Cu, Pb, Zn

NATIONAL LEAD CO, INC  
 (Member of Nuclear Metals Div of NATIONAL LEAD COMPANY)  
 Minneola  
 Gen Mgr: Brower Dellingr  
 AEC MILL, Monticello  
 Gen Sup't: G K Coates  
 Plant Sup't: J R Galbraith, Jr  
 Sampling Plant Sup't: R H Pearson  
 Safety Eng: J E Bailey  
 Ch Metal: E D Dickerman  
 Ch Eng: H R Sanders  
 Ind Rel Asst: W F Carman  
 Comptroller: G L Holt  
 Purch Agent: S L Mayne  
 (See Col & National Lead Co, N Y)

NATIONAL URANIUM CORP  
 29 Broadway, New York 6, N Y  
 Pres: Thomas J Danaby, Jr  
 EAGLE MINE, Henry Mountain dist, Garfield County, U<sub>3</sub>O<sub>8</sub>

NEVADA PARK MNG CO  
 P O Box 37, Provo  
 VP: Philip S Knight  
 Sec-Treas & Gen Mgr: Richard Knight  
 Mgr  
 (See Nev)

NEW PARK MINING CO  
 901 Walker Bank Bldg, Salt Lake City  
 Pres & Gen Mgr: W H H Cranmer  
 VP & Mgr of Oper: Clark L Wilson  
 Sec: Robert L Cranmer  
 Treas: R C Wilson  
 Purch Agt: Carl D Harper  
 MAYFLOWER MINE, Keetley, undergr, Au, Cu, Pb, Zn  
 Gen Sup't: Gale A Hansen  
 Geol: Walter E Bauer  
 Prod: 120 tons

NORBUTE CORP  
 Uranium Center Bldg, Grand Junction, Colo  
 VP: DeWitt C Deringer  
 Mgr: Western Mng Div: Abbott Charles Explor  
 (See N Y)

NORTH BINGHAM CONSOL MNG CO  
 P O Box 37, Provo  
 VP: Philip S Knight  
 Sec-Treas & Gen Mgr: Richard Knight  
 Mgr

NORTH STAR METAL MINES, INC  
 612 Hamm Bldg, St Paul 2, Minn  
 Pres: John Moren  
 VP: Leif Bachle  
 Sec-Treas: Fred Schmalz  
 NORTH STAR & OLD HICKORY MINES, Milford, undergr, surface, WO<sub>3</sub>, Cu, Ag, Au, Fe, U<sub>3</sub>O<sub>8</sub>, Manganese  
 500-TON FLOT MILL, at mine  
 Mine Sup't: George Bush  
 Mill Mgr: Keith Long  
 LEACHING PLANT, at mine

**NORTHERN RESOURCES CORP.**  
502 Atlas Building, Salt Lake City  
**CAMEL MINE**, Deer Flat dist.,  
San Juan County, U<sub>3</sub>O<sub>8</sub>  
Explor

**OL JATO URANIUM CO**  
26 W Broadway, Salt Lake City  
Pres: Owen W Bunker  
VP: Calvin Black  
Sec-Treas: Karl F Buell  
**WHIRLWIND MINE**, Mexican Hat,  
San Juan County undergr, U<sub>3</sub>O<sub>8</sub>  
Prod: 45 tons

**OLYMPIA URANIUM CO**  
39 Exchange Pl, Salt Lake City  
**Dwyer CLAIMS**, Salt Lake County  
Ag, Pb, Zn, U<sub>3</sub>O<sub>8</sub>  
Under devel

**PHILLIPS PETROLEUM CO,  
STRATEGIC MINERALS SEC-  
TION**  
Phillips Petroleum Bldg,  
Salt Lake City  
Dir Clifford N Holmes  
Ass't Dir David C Arnold  
Mng Eng: Roger Caywood  
(See N Mex, Okla)

**PIERCE & CASEY**  
831 1/2 S 400 E, Centerville  
**SILVERBELLE MINE**, Box Elder  
County open pit, Ag, Au, Pb, Fe,  
Cu, Mo  
Under devel

**PIUTE URANIUM CORP**  
39 Exchange Place, Salt Lake City  
Pres, P H Hunt  
VP & Sec, D H Bullough  
Treas, D H Bullough  
**PROPERTIES**, Beaver County Pb,  
Zn

**PLATEAU MNG CO INC**  
Box 397 Moab  
Pres: W D Nebeker, Jr  
VP-C Ed Flandro  
Sec-Treas: Maxwell Bentley  
Purch Agt & Gen Mgr: N Richard  
Seely  
**YELLOW CIRCLE MINES**, undergr,  
open pit, U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Prod: 20 tons  
(Subsidiary of The Westminster Corp)  
(See Colo)

**PLUTUS MNG CO**  
608 Dooly Bldg, Salt Lake City  
Pres: Cecil Fitch  
Vp & Gen Mgr: Cecil Fitch, Jr  
Sec & Purch Agt: W W Watson  
**PLUTUS MINE**, Eureka, undergr  
Ag, Pb, Au  
U<sub>3</sub>O<sub>8</sub>

**PYRAMID URANIUM, LTD**  
608 Rood Ave, Grand Junction,  
Colo  
Gen Part: K Dean Butter  
(See Colo)

**RADIUM KING MINES, INC**  
366 So 5th East, Salt Lake City  
Pres: Joe A Minton  
VP: Robert J Minton  
Sec-Treas: David L McKay  
Ass't Sec: K B Christensen  
VP & Gen Sup: D F Harrison  
VP & Ch Geol: A E Flinn  
Mech Eng: Chan A Scheer  
**ULA MINE**: Red Canyon dist, San  
Juan County, Cu, U<sub>3</sub>O<sub>8</sub>  
Mine Frm: W H Swank  
Mine Eng: Ed Carnahan  
Prod: 150 tons

**RAINBOW GOLD MINES CORP  
OF DELAWARE**  
PO Box 107, Marysville  
Pres: Louis C Deluke  
VP-Sec: Lucy Deluke  
Treas: A Paul Deluke  
**COPPER BELT MINE**, Piute County,  
undergr, Ag, Cu, Pb, Zn  
Under devel

**RAMBHORN MINES CO**  
333 Park Bldg, Salt Lake City  
Pres: W W Murray  
Sec: Leo Eager  
(Property under lease to Bayhorse  
Mines, Inc, Idaho)  
(See Idaho)

**RARE METALS CORP OF  
AMERICA** (Subsid of EL PASO  
NATURAL GAS CO)  
1st Security Bldg, Salt Lake City  
Pres: C L Perkins (Box 1492, El  
Paso, Tex)  
VP & Ass't Gen Mgr: M H Kline  
VP-R J Crowley  
Sec-Treas: Virgil Rittmann  
Ass't Sec: Anna Kidd  
Ch Eng, Explor Dept: J R Reynolds  
Ch Geol: L A Hansen  
Supervisor Land Dept: R O Baldwin  
Supt, Production Dept: A McKinney  
Supt, Explor Dept: E J Carlson  
Ch Chem: R Krosdahl  
Purch Agt: Claude J Jenkins  
Explor  
(See Ariz, Calif, Idaho, N Mex)

**REALTY URANIUM & MNG  
CO, THE**  
937 Nat'l Bank Bldg, Denver 2,  
Colo  
**LUCKY STRIKE MINE**, Shootering  
Creek, Henry Mts, Garfield County,  
undergr, surface, U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
(See Colo)

**RICO ARGENTINE MNG CO**  
217 Kearns Bldg, Salt Lake City  
Pres & Gen Mgr: Sherman B Hinckley  
VP J C Johnson  
Sec: L J Lerwill  
Treas: B B Hall  
(See Colo)

**ROCARDO MNG CO (ALSO  
LEWIS & CHENEY MNG CO)**  
2400 So Redwood Road, Salt  
Lake City 4  
Own: David G Lewis, C Cheney, Jr  
Gen Mgr: Walter Williams  
Geol: Andrew Regis  
**RAINBOW GROUP** Millard County  
Under devel  
(See Nev)

**ROCKY MOUNTAIN URANIUM  
CORP**  
1220 Mercantile Securities Bldg,  
Dallas, Texas  
Utah Agent: Critchlow, Watson &  
Warnock 1325 Continental  
Bank Bldg, SLC  
Auditor: R D Warrington  
**RAINY DAY MINE**, Circle Cliffs  
dist, Garfield County U<sub>3</sub>O<sub>8</sub>

**NORMAN ROGERS MNG CO**  
c/o Norman Rogers Box 1719  
Helena, Mont  
**NEW HOUSE CACTUS MINE**, Milford  
Mts.  
(See Cupric Mines Co)

**ROYAL CORPORATION**  
206 N Virginia St, Reno, Nev  
Pres: Sidney D Ackermann  
VP: Ronald F Sullivan  
VP-Treas: Peter Richards  
Sec: Peter Anderson  
**ROYAL MINE**, San Juan County,  
undergr, U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Gen Mgr: Robert L Cranmer  
Geol: Thos Harrison  
Mine

**ROYAL URANIUM CORP**  
Walker Bank Bldg, Salt Lake City  
Comptroller: F D Haddon  
Op: Boyles Bros Drilling Co,  
1321 So Main, Salt Lake City  
**ROYAL MINE** (Indian Creek Group)  
Monticello dist, San Juan County,  
U<sub>3</sub>O<sub>8</sub>

**SALT LAKE TUNGSTEN CO,  
THE**  
2160 Indiana Ave, Salt Lake City  
Pres: Blair Burwell  
VP: Marion E Pettigrew  
Sec-Treas: John J Davis

Purch Agt: E W Isham  
**TUNGSTEN REFINERY**, "Synthetic  
Scheelite"  
Mill Supt: Leonard Marinelli  
Ass't Mill Supt: Bemus Johnson

**SAMSON URANIUM, INC**  
801 Sherman St, Denver, Colo  
Gen Mgr & Purch Agt: Robert T  
Martin  
MINE, Moab, undergr, U<sub>3</sub>O<sub>8</sub>  
Hg  
(See Colo)

**SAN FRANCISCO CHEM CO**  
Dr F, Montpelier, Idaho  
**ARICKERE MINE**, N of Randolph,  
undergr, phosphate rock  
Gen Supt: Charles C Stephens  
(See Idaho, Wyo)

**SEAGMILLER PRAT & ETHEL**  
Marysville, Utah  
Op: Vanadium Corp of America  
**FREEDOM MINE**, Durkee Dist,  
Piute County, U<sub>3</sub>O<sub>8</sub>

**SHASTA MINERALS & CHEMI-  
CAL CO**  
612 Dooly Bldg, Salt Lake City 1  
Pres: K L Stoler  
VP: Harper Hunsaker  
Sec-Treas: Reed L Reeve  
Ass't Sec-Treas & Traffic Agt:  
Nancy C Hardman  
U<sub>3</sub>O<sub>8</sub> Prod  
(See Calif)

**SHOOTING CREEK MNG  
CORP**  
P O Box 104, Richfield  
Pres: John A Robertson  
Agent: Harold Elker  
VARIOUS CLAIMS, Henry Mt dist,  
Garfield County, U<sub>3</sub>O<sub>8</sub>  
Prod: 250 tons

**SHUMWAY-MERWIN,  
BURDETT, EUGENE AND  
GLEN A** And Radio Geophysical Co,  
San Antonio, Texas  
Blanding, Utah  
**PAT DAY MINE**, Elk Mountain Dist,  
San Juan County, U<sub>3</sub>O<sub>8</sub>

**SHUPE WADE AND NELLIE**  
Moab, Utah  
Sec-Treas: T J Christiansen  
**LAST CHANGE #1 MINE**, Browns  
Hole dist, San Juan County U<sub>3</sub>O<sub>8</sub>

**SILVER BUCKLE MNG CO**  
904 Walker Bank Bldg, Salt Lake  
City  
Pres: Dr F E Scott  
VP & Gen Mgr: Clark L Wilson  
Sec: Alden Hull  
Treas: Jack D Gay  
**URANIUM PROP**, Big Indian dist,  
San Juan Co  
Explor  
(See Idaho)

**SILVER STANDARD MNG CO**  
39 Exchange Place, Salt Lake City  
**LAKES OF KILLARNEY MINE**,  
Tooele County, Au  
(Explor by New Park Mng Co)

**SIOUX MINES COMPANY**  
1116 Walker Bank Bldg, Salt Lake  
City  
Auditor: Glen Hardy  
**SIOUX MINE**, Timpanogos dist, Utah  
County, Au, Ag, Cu  
(Lessee's operation)  
Prod: 112 tons

**L H SMITH MINING CO**  
Box 932, Monticello  
Gen Mgr: L H Smith  
**INDIAN CREEK MINES**, undergr,  
U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Under devel

**STANDARD URANIUM CORP**  
**STANDARD COL-U-MEX JOINT  
VENTUREI**  
264 South 4th East, Moab, Utah  
P O Box 588  
Pres & Gen Mgr: William R McCormick  
VP: Mitchell Melch  
Sec: Aaron Holman  
Treas: I Newton Brostan  
Ass't Gen Mgr: Russell L Wood  
Purch Agt: James B King  
**BIG BUCK MINE**, Big Indian dist,  
U<sub>3</sub>O<sub>8</sub>  
Mine Frm: Robert Hurst  
Geol: Robert R Ward  
(See Colo)

**STANSBURG CONSOL MNG CO**  
Box 604, Grantsville  
Pres: E C Berry  
Sec-Treas: R L Gehrig  
**DRAGON GROUP**, N Willau Canyon  
nr Grantsville, Tooele County,  
undergr, open pit, Pb, Cu, Ag  
Under devel

**STAR DUST MINES, INC**  
No 4, 263 E South Temple  
Salt Lake City  
Pres & Gen Mgr: Fred Cook  
VP: Wm E Huylar  
Sec-Treas: W M Nance  
**STAR DUST MINE**, Gold Hill, undergr,  
surface, WO<sub>3</sub>  
U<sub>3</sub>O<sub>8</sub>

**STOCKS & GRAMLICH, INC**  
Moab, Utah  
Pres: H S Stocks  
Agent: Paul C Steinke, 164 E Center  
Nash  
**GREY DAWN AND FIRE FLY MINES**,  
Paradox-LaSal dists, San Juan Cty,  
U<sub>3</sub>O<sub>8</sub>

**STRATEGIC MINERALS EXPL  
CO**  
P O Box 1048, Grand Junction,  
Colo  
Managing Part: John I Schumacher  
Metallurgy & Oil: Harold C Anderson  
PROPERTY, LaSal Creek & Red  
Canyon areas, U<sub>3</sub>O<sub>8</sub>  
Explor

**SUNBURST URANIUM COR-  
PORATION**  
1975 NW Everett St, Portland 9,  
Oregon  
**SAN JUAN CLAIMS**, Lander County,  
undergr, U<sub>3</sub>O<sub>8</sub>  
(See Nev, Oregon)

**SUNSHINE MNG CO**  
738 Peyton Bldg, Spokane 1, Wash  
**RANDOM MINE**, Box 474, Blanding,  
Cotton Wash, San Juan County,  
undergr, U<sub>3</sub>O<sub>8</sub>  
Gen Mgr: E E Eddy  
Mgr, Min Div: John Edgar  
(See Idaho, Wash)

**TANNER & TANGREEN**  
Box 865, Kirland, N Mex  
**MINE**, White Canyon, undergr,  
U<sub>3</sub>O<sub>8</sub>, Cu  
Gen Mgr: Lynn C Tanner  
Ass't Gen Mgr-Geol: A C Tangreen  
Under devel

**TEMPLE MOUNTAIN URANIUM  
CO**  
39 Exchange Place, Salt Lake City  
Pres: Herman Heinecke  
VP: Geo Heinecke  
Sec-Treas: Augustus Reeves  
**CLAIMS**, Green River, Torrey,  
undergr, surface, Ag, Pb  
Prod: 183 tons  
(See Idaho)

**TEXAS-ZINC MINERALS  
CORP**  
628 Rood Ave, Grand Junction,  
Colo  
Pres: A L Hayes  
**HAPPY JACK MINE**, White Canyon  
via Blanding, undergr, U<sub>3</sub>O<sub>8</sub>  
Gen Supt: R E Radabaugh  
Min Supt: E J Swapp  
800-TON MILL, Mexican Hat, acid  
leach & Solvent extraction  
Mill Supt: K C Apland

## Utah

**THOMPSON, J R**  
Box 264, Danbury, Colo  
Op: E E Lewis & Associates  
**BLACK STONE 1-9 MINES**, Yellow  
Cat dist, Grand County, U<sub>3</sub>O<sub>8</sub>

**THOMPSON, WARREN BARRY**  
P O Box 1927, Denver, Colo  
**FROSS MINE**, Washington County,  
undergr., Au, Ag, Hg, V<sub>2</sub>O<sub>5</sub>, U<sub>3</sub>O<sub>8</sub>  
Gen Mgr: and Lessee: W B Thompson  
Under devel  
(See Colo, N Mex)

**THORNBURG MNG CO**  
140 W Main St, Grand Junction,  
Colo  
Own & Gen Mgr: Vance Thornburg  
Sec-Treas: J T Tunnel  
**7 MILE MINE**, 12 1/2 mi NW of Moab,  
undergr., U<sub>3</sub>O<sub>8</sub>  
Mine Supt: Edward G Johnson  
Prod: 15 tons  
(See Colo)

**TINTIC LEAD CO**  
39 Exchange Place, Salt Lake City  
Pres: P H Hunt  
VP: D M Draper, Sr  
Sec-Treas: D H Bullock  
MINE, Milford, open pit, Cu  
(Leased)

**TINTIC STANDARD MNG CO**  
114 Walker Bank Bldg, Salt  
Lake City  
Pres: H E Reddats  
VP: Roy M Jacobs  
Treas & Gen Mgr: M D Paine  
Sec: Glen Hardy  
Eng-Geol: Fred W Hanson  
**TINTIC STANDARD MINE**, Division,  
undergr., Au, Ag, Cu, Pb, CaF<sub>2</sub>  
Under devel

**TINTIC URANIUM CO**  
114 Walker Bank Bldg, Salt  
Lake City II  
Pres: H E Reddats  
VP: L L Travis  
Sec: Glen Hardy  
Treas: M D Paine  
MINE, Moab, U<sub>3</sub>O<sub>8</sub>  
Geol: Fred W Hanson  
Mine Supt: Ralph E Hawke  
Frms: Lynn Hawks  
Under devel

**TOPAZ URANIUM CO**  
Delta  
Pres: Richard D Moody  
VP: M Ward Moody  
Sec: M J Moody  
MINE, undergr., U<sub>3</sub>O<sub>8</sub>  
Prod: 50 tons

**TWO STATES URANIUM CO**  
Box 27, Bountiful  
(See Wyo & Peterson, M F & Loren, in  
Nevada)

**U-NEVA URANIUM CORP**  
Suite 101, 140 S Main St,  
Salt Lake City I  
Pres: Walter E Cosgriff  
VP: Sidney E Mulcock  
Sec-Treas: Judge M K Snow  
**CURAY CLAIMS**, Uintah County,  
U<sub>3</sub>O<sub>8</sub>  
**BEE, TEMPILAR, BIRDSEYE &**  
VERA CLAIMS, Emery County,  
U<sub>3</sub>O<sub>8</sub>

**MONTE CARLO, MONTE CHRISTO**  
CLAIMS, Tooele County, Hg, Pb  
Under devel

**UNION CARBIDE NUCLEAR**  
CO, A DIV OF UNION  
**CARBIDE & CARBON CORP**  
P O Box 1189, Grand Junction,  
Colo  
MINE, Green River, U<sub>3</sub>O<sub>8</sub>  
Mine Supt: Gordon Irvin  
MILL, Green River  
Mill Supt: D M Pembroke  
(See Calif, Colo, N Y)

**UNITED MINERALS CORP**  
516 Felt Bldg, Salt Lake City  
Pres & Gen Mgr: G W Snyder, Jr  
VPs: G W Snyder, H A Covy  
Sec: Guy Snyder  
(See Ariz, Nev)

**UNITED PARK CITY MINES**  
CO  
1007 Kearns Bldg, Salt Lake City  
Pres: John M Wallace  
VP: Frank A Wardlaw, Jr  
Sec-Treas: J Wm Stoner  
Purch Agt: T K Davis  
MINES, Heber, Park City, undergr.,

Pb, Zn, Ag, Au  
Gen Mgr: S K Droubay  
Gen Supt: G W De LaMare  
Ch Geol: H V Stewart  
Ass't Gen Supt: Arthur Gray  
Prod: 250 tons

**U S LITHIUM CORP**  
1205 Walker Bank Bldg,  
Salt Lake City  
Pres & Gen Mgr: Paul T Walton  
VP & Sec: N O Morgan, Jr  
(See Colo)

**UNITED STATES GYPSUM CO**  
300 W Adams St, Chicago 6, Ill  
MINE, Sigard, open pit, gypsum  
Works Mgr: R M Paschall  
(See Calif, Colo, Conn, Ill, Ind, Iowa,  
Mass, Mich, Mont, Nev, N Mex, N Y,  
Ohio, Okla, Tex, Va)

**UNITED STATES SMELTING,**  
**REFINING & MINING CO**  
WESTERN OPERATIONS  
New House Bldg (Box 1980),  
Salt Lake City 10

VP & Gen Mgr, West Oper:  
O A Glaser  
Mgr, West Mines: Benton Boyd  
Asst to VP & West Mines:  
Max M DuBois  
Mgr, Midvale Plant: H L Johnson  
VP & Ch Geol: R H Hunt  
Indus Devl Dir: M J Ehrhorn  
Ch Mech Eng, West Oper:  
Boris Ashurhoff

**UTAH OPERATIONS**  
U 3 & LARK MINE, Bingham dist,  
Pb, Zn, Cu  
Supt, U 3 Section: John Holmes  
Supt, Lark Section: Harold Wells  
MIDVALVE PLANT, PLOT MILL &  
LEAD SMELT  
Mgr: H L Johnson  
Gen Supt: C A Nelson  
! Mill Supt: A Nelson  
(See Alaska, Ariz, Mass)

**U S STEEL CORP**  
**COLUMBIA-GENEVA DIV**  
120 Montgomery St, San Francisco,  
Calif  
VP: L J Westover  
Gen Supt: L F Black  
**BLAST FURNACE**, Geneva, near  
Provo  
(See Alaska, Ala, Calif, Minn, Pa,  
Tenn, Wyo)

**URANIUM CORP OF AMERICA**  
3955 S State, Salt Lake City  
(See Colo, N Mex)

**URANIUM KING CORP**  
320 Nees Bldg, Salt Lake City  
Pres: Joseph Sherman  
VP: Francis D Nielsen  
Sec-Treas: J A Bateman

COVE MINE, White Canyon, undergr.,  
Cu, U<sub>3</sub>O<sub>8</sub>  
Prod: 30 tons

(Operated under a lease to C O G  
Minerals Corp)

**URANIUM PROSPECTORS CO**  
LTB  
P O Box 67, Salt Lake City

Sec-Treas: H D Height  
**JACK RABBIT MINE**, San Rafael  
Reef dist, Emery County, U<sub>3</sub>O<sub>8</sub>

**URANIUM REDUCTION CO**  
557 Int Security Bldg, Salt City II

Pres: Mitchell Melich  
Exec VP: R A Young  
VP: Charles A Steen  
Sec: C M Christensen  
Cont & Treas: John W Losse, Jr  
Purch Agt: Rev Jones  
MILL, Moab, Acid Leach, RIP  
Gen Mgr: R F Hollis  
Plant Supt: L A Painter  
Ass't Plant Supt: R W Unger  
Ch Chem: Buford Winn  
Ch Met: T Ixxo

**UTAH ALLOY ORES, INC**  
Room 302, 101 N High St,  
Columbus, Ohio  
Sec: Simon Nash

**YELLOW CAT MINE**, Yellow Cat  
dist, Grand County, U<sub>3</sub>O<sub>8</sub>

**UTAH CONSTRUCTION CO**  
Box 970, Cedar City

Project Mgr: E C DeMoos  
Mine Eng: York F Jones  
Dovell Eng: J H Olson  
Other Eng: E J Robinson  
Ch Acct: Rev E Harris  
**EXCAVATION MINE**, Iron Springs  
dist, Iron County, Fe  
Prod: 440,000 tons  
(See Calif)

**UTAH ORE SAMPLING CO**  
Box 217, Murray  
Pres: E G Jensen  
VP & Gen Mgr: Arnold Berlin  
Sec-Treas: R E Allen  
**CUSTOM SAMPLING MILL**  
Mill Supt: J T Johnson

**UTCO URANIUM CORP**  
310 1st Nat'l Bank Bldg, Denver,  
Colo  
(See Ariz, Colo, New Mex)

**UTE EXPLOR CO**  
P O Box 487, Moab  
Pres: Charles A Steen  
VP: Wm R McCormick  
Sec: Mitchell Melich  
Treas: Maxine Stein Boyd  
Exec Asst: Mary Hope Westbrook  
Comptroller: A T Ludlow  
Purch Agt: Margie Shaffer  
**MIL VIDA MINE**, undergr., U<sub>3</sub>O<sub>8</sub>  
Gen Supt: Virgil Bilyeu  
Geol: Mac Pierson  
Ass't Supt: Ted Barrett  
Mine Frmr: Hall Thorne  
Chemist: Lauren Ball

**VANADIUM CORP OF AMERICA**  
Marysville  
Pres: W C Keeley  
VP & Gen Mgr: D W Vilas  
**PROSPECTOR, FREEDOM & FARMER**  
JOHN MINES, Marysville, undergr.,  
U<sub>3</sub>O<sub>8</sub>  
Mine Supt: Maurice Castagno  
Geol: E E Wauters  
(See Ariz, Colo, N Mex, N Y)

**VANURUM URANIUM, INC**  
Marshall Court, Moab  
Pres: William T Swift  
VP: Ellis R Cook, Jr  
Field Supervisor: Everett Blackburn  
(See Colo)

**VITRO URANIUM CO**  
(A DIV OF COTTON CORP OF AMERICA)  
600 W 3300 So St, Salt Lake City  
Pres: W B Hall  
Asst to Pres: R N Miller  
VP: R C Cole  
Sec: W H Denne  
Treas: R T Ruder  
Office Mgr: H D Height  
Purch Agt: C A Theobald  
**850 TON HYDROMETALLURGICAL**  
PLANT, Salt Lake City  
Met: L D Lash  
Oper Supt: M T Ellis  
Pl Eng: T G Rukavina  
Prod Mgr: J D Moore  
One Buyer: R B Coleman  
Ch Chem: G W Hansen  
(See Wyo)

**VULCAN URANIUM MINES**  
INC  
1120 Tenth Ave North, Seattle 2,  
Wash  
Pres: Herman J Rosel  
VP: W J Logus  
Sec: M A Logus  
**CANCER CURE & ADJOINING CLAIMS**,  
San Rafael Swell, Emery County

**WALKER ENGR CORP**  
612 Dooly Bldg, Salt Lake City  
Pres: W J Walker  
VP: R T Walker, Jr  
Sec: Belle T Walker  
(See Colo, Idaho)

**WASATCH MINES CORP**  
30 Stock Exchange Pl,  
Salt Lake City  
Lessee: Olympic Uranium, Inc.,  
525 Newhouse Bldg, SLC  
**WASATCH MINES NO 5**, Little  
Cottonwood Dist, Salt Lake County,  
Au, Ag, Cu, Pb, Zn  
Under devel

**WEST PARK MINING CO**  
Box 488, Provo  
Pres: J H Petersen  
VP: J Julian Morgan  
Sec-Treas & Purch Agt: Dean W Payne  
**WEST PARK MINE**, 2 mi S of  
Brighton & 6 mi NW of Midway,  
undergr., Cu, Au, Ag  
Gen Mgr: Arvil H Scott  
Geol: E A Hewitt  
Prod: 8 tons

**WEST PAY DAY MINES**  
c/o Rom Warburton  
P O Box 1886, Grand Junction,  
Colo  
Trustee & Partner: R B Daniel  
**WEST PAY DAY MINE**, White Canyon  
dist, San Juan County, U<sub>3</sub>O<sub>8</sub>

**WEST TOLEDO MINES CO**  
39 Exchange Place, Salt Lake City  
Pres: Sid Spencer  
Sec-Treas: David H Bullough  
Mines, Alta, Little Cottonwood  
dist, undergr., Pb, Ag

**WESTERN GOLD & URANIUM**

INC  
Box 152, St George  
Pres: Ralph G Brown  
VP: David P Shura  
Sec: Berene Bachus  
Com: Met: Alan Kiseock  
Com Eng: C E Prior  
**SILVER REEF MINE**, Leeds, undergr.,  
U<sub>3</sub>O<sub>8</sub>, Ag, Cu  
Gen Supt: Richard V Syman  
Mine Supt: Jack K Howell  
Ass't Mine Supt: Carl Vanlandingham  
Mine Frmr: Carlyle Stirling  
Prod: 150 tons  
**APPLEGARTH MINE**, Marysville,  
Alamite  
Gen Supt: Richard V Wyman  
Ch Geol: Max E Kofford  
Under devel  
**75 TON SILVER PLOT MILL**,  
Silver Reef  
Mill Supt: Jack K Howell  
Ass't Mill Supt: Carl Vanlandingham  
Assay: Art Eastman  
(See Ariz, Colo)

**WESTERN ORE & ALLOY**

CORP  
1375 S State St, Salt Lake City 15  
Pres & Gen Supt: Griff Williams  
VP: Rulon Garner  
Sec: Rendell N Mabey  
**YELLOW HAMMER, FRANKIE MINES**,  
Bold Hill, undergr., open pit, Cu,  
Au, Ag, WO,  
**50 TON PLOT GRAV MILL**, Gold Hill

**WESTMINSTER CORP**  
416-20 1st Nat'l Bank Bldg,  
Denver, Colo

Pres: David W Adams  
VP: Melvin C Bowles  
VP & Treas: T R Llewellyn  
Sec: Jim T Holman  
**CAMEL MINE**, Deer Flat, U<sub>3</sub>O<sub>8</sub>  
**BOOMERANG, BOOMRANGE**  
**ESCARPMENT & GERTRUDE**  
MINES, White Canyon, U<sub>3</sub>O<sub>8</sub>  
Under devel  
(See Ariz, Colo, Nev, Wyo)

**WHEELCHEL MINES CO**  
1016 Arthur St, Caldwell, Idaho  
Pres: William E Wheelchel  
VP: Ralph A Wheelchel  
Sec-Treas: Thressa M Wheelchel  
**MECATON & PLUTOMIC GROUP**,  
U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Under devel

(See Nev)

**WHITE CANYON MNG CO**  
200 N 6th St, Grand Junction,  
Colo

Pres: A L Hayes  
VP: T R Redman  
Sec: Walter E Will  
Treas: E E Schwegler  
Purch Agt: John H Crawford  
**HIDEOUT & WHITE CANYON NO 1**  
MINES, San Juan County, undergr.,  
U<sub>3</sub>O<sub>8</sub>, Cu  
Mgr: A F Boyd  
Geol: Carl F Lipp  
Surv: James R Franklin  
Mine Supt: Robert V Hancock  
Ass't Mine Supt: P H Lamberton  
Mine Frmr: Wilbert Hancock,  
Lester Hancock  
Prod: 250 tons

**WILSON, HOWARD**  
Gallup, New Mexico  
**TAYLOR REID #1 MINE**, Monument  
Valley dist, San Juan County, U<sub>3</sub>O<sub>8</sub>  
Prod: 572 tons

**WOODMONT, INC**  
(Wholly owned subsid of CONTINENTAL  
URANIUM, INC)  
820 S Ninth St, P O Box 1550  
Grand Junction, Colo  
**RATTLESNAKE MINE**, Moab, open  
pit, U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Mine Supt: John Roscoe  
Prod: 360 tons

**YANKEE CONSOLIDATED**

MINES CO  
c/o Rom Warburton  
Kearns Building, Salt Lake City  
Sec-Treas: Rom Warburton  
**YANKEE CONSOLIDATED**, Tintic  
dist, Utah County, Au, Ag, Cu, Pb,  
Zn

**Vermont — Washington**

**VERMONT**

**APPALACHIAN SULPHIDES INC**

6th Flr., 360 Bay St., Toronto,  
Ont., Canada  
Pres: J Cunningham-Dunlop  
VP: W H Woods  
Treas: H E Naus  
Sec: Philip Bastedo (New York City)  
**ELIZABETH MINE**, South Strafford,  
undergr., Cu, Ag  
Idle  
950-TON FLOT MILL, South Strafford  
(See N C)

**EASTERN MAGNESIA TALC CO, INC**

Baldwin Ave., South Burlington  
Pres: E W Magnus  
VP & Gen Mgr: W W Magnus  
Treas: R F Patrick  
Gen Sup't: V A Backels  
Eng: L H Durkee  
NO 2 MINE, 5 1/2 mi S of Waterbury,  
undergr., talc  
Mine & Mill Sup't: Roger W Perkins  
Prod: 10,000 tons  
MINES #3, Hammondsdale, open pit,  
Mine & Mill Sup't: Winston Bessemer  
Prod: 80 tons  
100-TON DRY GRINDING MILL,  
South Burlington  
Mill Sup't: M G Eastman  
NO 4 MINE, 5 1/2 mi N of Johnson,  
undergr., talc  
Mine & Mill Sup't: Roger W Perkins  
Mine: Cliff Allen  
Prod: 200 tons  
100-TON FLOT-DRY GRINDING MILL  
Mill Sup't: Ken Stewart

**RUBEROID CO., THE**  
500 Fifth Ave., New York, N Y  
**VERMONT ASBESTOS MINE DIVISION**,  
Hyde Park  
MINE, Lowell, open pit, chrysotile,  
asbestos  
Gen Mgr: I E Matthews  
Asst Gen Mgr: W M Page  
Geol: L Jordan  
Mech Eng: E E Lanphere  
Mine Sup't: M J Potter  
Ass't Mine Sup't: R O'Hean  
Mine Eng: R K White  
MILL, air separation  
Mill Sup't: C C White  
Ass't Mill Sup't: R C Wescombs  
(See N Y)

**VERMONT KAOLIN CORP**  
150 Cherry St., Burlington  
c/o P F Jurgs and Company  
MINE, Montague, kaolin  
Under devel.

**VERMONT TALC CO**  
Chester  
Pres: T A Yager  
Sec: Giles Blague  
MINE, undergr., talc  
Mine Sup't: Frederick De Zaine  
Mill, Chester

**VIRGINIA**

**ALLIED CHEM & DYE CORP., GEN CHEM DIV**

Box 389, Galax  
GOSEAN MINE, 6 mi N of Galax  
undergr., phyllite concentrates  
Gen Mgr: R H Dickson  
Supt: James O Nichols  
Mine Frm: R F Dillon  
Ass't Sup't: A H Yarberry  
1000-TON FLOT-GRAV MILL  
Mill Frm: O W Manuel  
(See Colo., N Y)

**AMERICAN CYANAMID CO., PIGMENTS DIV**

Piney River  
MINE, open pit, ilmenite & apatite  
FLOT-MILL, Piney River  
Mine & Mill Sup't: L L Campbell  
PLANT  
Plant Mgr: J S Carter  
Ass't Plant Mgr: J F Hopkins  
Mech Eng: J M McDonagh  
Elec Eng: J Wilson  
(See Ark., Fla., Ga., NY)

**AMERICAN PIGMENT CORP**

Hawthorne  
Exec VP: R G Fizer  
Iron Oxide Pigments

**CLINCHFIELD SAND & FELDSPAR CORP**

Plant Mgr: W A Naper  
COLES, CRESWELL, MITCHELL &  
PEAKESVILLE MINES, Feldspar

**FOOTE MINERAL CO**

18 W Chelten Ave., Philadelphia 44,  
Pa

**SUNBRIGHT DIVISION**, Duffield

c/o W Edwin Dill, Jr.  
MINE, Sunbright, undergr., limestone  
Gen Mgr: A McDonald  
Ass't Gen Mgr: W Hudspeth

Geol: T Kesler  
Mine Supt: T Evans  
Mine Frm: J Hughes

MILL, at mine  
CHEMICAL PLANT, at mine  
(See N H, N.C., Pa., Tenn.)

**INTERNATIONAL MINERALS & CHEMICAL CORP**

Piney River

**APLITE MINE**

Supt: Claude Ellis

Prod: 100 tons

(See Ariz., Colo., Fla., Ill., Me., Miss.,

N Mex., N.C., Ohio, S.D., Tenn., Wyo.)

**KYANITE MINING CORP**

BAKER MOUNTAIN MINE, Cullen,

open pit, kyanite

WILLIS MT MINE, Dillwyn, open

pit, kyanite

Pres: Gene Dixon

**METAL & THERMIT CORP**

Haerwoodam

MINE, open pit, Rutile, Ilmenite

Pl Mgr: L W Forbes

**NATIONAL GYPSUM CO**

Kingsville

MINE & PLANT, undergr., limestone

Mine Eng: L G Grobb

Plant Mgr: Monroe Rule

Prod: 2000 tons

(See Ind., Iowa, Kan., Mich., N.Y.,

Ohio, Pa., Texas)

**NEW JERSEY ZINC CO**

Austinville

**BERTHA MINERAL DIV MINE, Zn**

Fns

Mine Supt: K R Winslow

2,000-TON FLOT MILL

Supt: W L Albers

(See Colo., Ill., N.J., N.Mex., N.Y.,

Pa., Tenn., Wis.)

**REYNOLDS MINING CORP**

Reynolds Metal Bldg., Richmond

Pres: Walter L Rice

VP: R H Zieglin, J Louis Reynolds

VP & Treas: C E Coghill

Sec: Allyn Dillard

Ch Geol: John D Moses

Safety Eng: J E Nichols

Purch Agt: M W Henry

(See Ark., Colo.)

**RIVERTON LIME & STONE CO**

Dominion Mineral Div., Piney River

**APLITE MINE**

Plant Mgr: R C Brand

**TRI-STATE ZINC, INC**

70 Pine St., New York, N.Y.

VP & Gen Supt: V C Allen

BOWERS-CAMPBELL MINE, Timberville, undergr., Zn

Gen Sup't: Daniel Geary

Mine Sup't: Carl Box

Prod: 720 tons

720-TON FLOT MILL, Timberville

Mill Sup't: M C Bailey

(See Ill., N.Y.)

**U S GYPSUM CO**

Plasterco

Works Mgr: H D Decker

NUMBER SIX MINE, at Plasterco,

undergr., gypsum

Mine Sup't: E M deo Rockers

Gen Frm: D R Davis

Prod: 1,000 tons

(See Calif., Colo., Conn., Ill., Ind., Iowa,

Mass., Mich., Mont., Nev., N Mex., N.Y.,

Oklahoma, Tex., Utah)

**VIRGINIA-CAROLINA CHEM CO**

40 E Main St., Richmond 8

Pres: William H Wilson

VP: C E Heinrichs

Sec: Richard E McConnell

Treas: I D Daves

Purch Agt: Douglas W Laird

(See Fla., Tenn.)

**D L Feathers, R H Cutting**

Sec: D L Feathers

Treas: Emmett G Solomon

Purch Agt: Gil Mayes, Kellogg, Idaho

BONANZA MINE, Colville, Pa., Ag

Under devel

**FABRICATION PLANT & SECONDARY LEAD SMELTER**, 2700 16th Ave., SW,

Seattle, Wash

Prod Mgr: Alvin Kroll

VR, Sales & Fabrication: Roger H. Cutting

(See Colo., Idaho)

**CAMBRIAN MNG CO**

526-27 Hutton Bldg., Spokane

Pres: Lloyd E Sherrill

VP: Theodore Kary

Sec-Treas: Kenneth R Bagdas

PROSPECTS, Stevens & Pend Oreille Counties, open pit, U<sub>3</sub>O<sub>8</sub>, Pb, Cu,

Zn, WO<sub>3</sub>

Under devel

**CHROME CLIFF MNG CO**

1315 Dudley Ave., Prosser

Pres: Fred W Wagner, Jr.

VP: Bert Thomburg

Treas: Thomas West

CHROME CLIFF, QUEEN CAROL & KROME KING MINES, undergr. &

open pit, Cr

Gen Mgr: James Dow

Idle

**CLAYLOON URANIUM CO., INC**

319 Feyton Bldg., Spokane 1

HUFFMAN LEASE, Spokane County,

U<sub>3</sub>O<sub>8</sub>

Under devel

**CLEAR WATER MINES, INC**

40 Empire State Bldg., Spokane 1

Pres: H G Loop

VP: John Healy

Sec-Treas: E I Fisher

Purch Agt: John Healy

CLEAR WATER MINE, undergr.

Under devel

**CONSOL MINES & SMELTING CO, LTD**

Star Bldg., Wilbur

Pres: Hugh Brown

VP: Jack Blaine

Purch Agt: Douglas Brown

Sec: E H Edgar

Treas: D N Gellatly

THREE PROPERTIES at Keller,

Ferry County, undergr. & surface,

Cu, Mo, Pb, Zn, Mn, U<sub>3</sub>O<sub>8</sub>

Under devel

**CRYSTAL CITY MNG CO**

1127 Old Sprague St., Greenacres

Pres: Luke Williams

VP: Charles M Williams

Treas: Tom Staudaker

CRYSTAL MINE, Lincoln County,

undergr., Miles area, Ag, Pb, Cu,

WO<sub>3</sub>

Under devel

**DAHL URANIUM MINE, INC**

Pres: H J Tibbles

DAHL MINE, Mt Spokane area,

U<sub>3</sub>O<sub>8</sub>

Under devel

**DAY BREAK URANIUM, INC**

1270 Valleyway, Opportunity

Pres: James W Fox

VP: Alvenstellen

Sec-Treas: Kae H Sowers

DAY BREAK MINE, open pit, autonite,

uraninite, coffinite

Mine Supt: E A Collins

Geol: H W Norman

Met: J Fred Williams, Jr.

Prod: 100 tons

**DAWN URANIUM & OIL CO**

422 Paulsen Bldg., Spokane

-Pres: Gaylen Jones

VP: Charles Weber

Sec-Treas: C R Echlin

SMITH, WISEMORE LEASE, &

CURTIN FARM MINE, Spokane County,

U<sub>3</sub>O<sub>8</sub>

Under devel

**DAWN MINING CO**

Ford

Pres: G S Hinckley

MIDNITE MINE, Stevens County

1015 S Post St., Spokane, U<sub>3</sub>O<sub>8</sub>

Gen Mgr: R B Fulton

Ass't Gen Mgr: Don Hargrove

Under devel

## Washington

### DEER LAKE TUNGSTEN MINE

Box 384, Deer Park  
Mgr: W H West  
MINE, Blue Grouse Mt., undergr.,  
surface, WO<sub>3</sub>  
Prod: 25 tons  
25-TON GRAV MILL

### DELMAR MNG & MLG CO

N 5018 Lincoln, Spokane 19  
Pres: Norman E Mills  
VP: Adolph Ober  
Sec: Harry O Klaus  
(See Idaho)

### DEVIL'S CANYON MNG CO., INC.

801 Central Blvd, Seattle 4  
Pres & Gen Mgr: Vernon M Osterberg  
VP: Edwin Saurers  
Sec: W D Gotham  
Treas: Dr G M Osterberg  
DEVIL'S CANYON MINE, Buena  
Vista Mine dist, King County, undergr.  
& open pit, Cu, Mo, WO<sub>3</sub>, Ag, U<sub>3</sub>O<sub>8</sub>  
Under devel

### EAGLE PEAK COPPER MINING CO

Box 86, Ashford  
Pres: R H Wheelock  
VP: Eva Crisman  
Sec-Treas: R P Crisman  
MINE, Lewis County, undergr., Cu,  
Au  
Gen Mgr: R H Wheelock  
Under devel  
FLOT MILL, Pierce County  
Under constr

### EVERGREEN MINES, INC

5002 Ivanhoe Pl NE, Seattle  
Pres: John Wiatrak  
EVERGREEN MINES NO 1 & 2,  
Whatcom County, Pb, Zn, Cu, Au,  
Ag  
Under devel

### GENERAL MINES CORP

40 Empire State Bldg, Spokane 1  
Pres: H G Loop  
VP: Chris Roholt  
Sec-Treas: E I Fisher  
Purch Agt: Harry Linden  
GENERAL MINES, undergr.  
Gen Mgr: H G Loop  
Mine Supt: Norman Ross  
Ass't Supt: Joe Hollingsworth  
Under devel

### GEO-RESOURCE CORP

526 Hutton Bldg, Spokane 4  
Pres: W D Weaver  
BLUE MOUNTAIN PROPERTY,  
Stevens County, U<sub>3</sub>O<sub>8</sub>  
Under devel

### GERMANIA CONSOL MINES, INC

40 Empire State Bldg, Spokane 1  
Pres & Gen Mgr: Henry J Franz  
VP: H G Loop  
Sec-Treas: E I Fisher  
GERMANIA CONSOL MINE, Hunters,  
undergr., WO<sub>3</sub>, U<sub>3</sub>O<sub>8</sub>  
40-TON GRAV-FLOT MILL, Hunters  
Site

### GLADSTONE MT MNG CO

202 Radio Central Bldg, Spokane  
Pres: Wm H Sawn  
VP: Fred W Viles  
Sec-Treas: E E Nicholls  
GLADSTONE MINE, at Leadpoint,  
Pb, Ag  
Lessee: A G Lotze

### GLACIER MINING CO

Box 11, Glacier  
Mgr: J R Atkeson  
MIDAS MINE, Glacier area, Cu, Ag,  
Au  
Supt: Wm A Farrow  
Under devel

### GOAT CREEK MNG & DEVEL CO

Mazama  
Pres: Alva R Sharp  
Mgr: Robert G Stewart  
SILVER KING, APRIL, GOLD  
MOUNTAIN, GOLD BOE, &  
SUNVIEW MINES, Mazama, undergr.,  
Cu, boron, magnetite, WO<sub>3</sub>, Zn, Ag,  
Au  
Under devel

### GOLDBEL MNG CO

112 N "K" St, Tacoma 3  
Own: Ben E Luebbe  
SEPMAN MINE, undergr., quicksilver  
Mine Supt: Floyd Ray

Mine Eng: Matthew Maddens  
MILL & SMELTER, Morton  
Assay: Galen Prince

### GOLD BOND MINING CO

300 Columbia Bldg, Spokane 4  
Pres: Frank Lilly

MINE, Chelan County, Au, Ni

Under devel

### GOLDFIELD CONSOL MINES CO

Box 2520 or 206 N Virginia St,  
Reno, Nevada

Res Mgr: T Higginsbotham

ANDERSON MINE, Leadpoint dist,

Zn, Pb

Under devel

### GOLDSTONE MNG CO

511 Securities Bldg, Seattle

Pres & Gen Mgr: B W Porter

VP: Lynn Gunning

(See Idaho)

### GRANDVIEW MINES

310-311 Radio Central Bldg

Spokane 4

Pres: Karl W Jasper

VP: Paul Hoestel

Sec: E K Barnes

GRANDVIEW MINE, Metaline, Zn,

Pb

Prod: 800 tons  
(Operated by American Zinc, Lead & Smelting)

### H & R CORP

2121 Everett Ave, Everett

RAINEY CLAIM & OTHERS, Taylor

R dist, King County, Au, Ag, Cu, Pb,

Zn

Under devel

### HERA EXPLOR CO

Box 8, Renton

Pres & Gen Mgr: W H Pillatos

VP: Dr W J Collins

Sec: George Ames

Met-Geol: J J Sherwood

MINE, Wallace Creek Mg dist,

undergr.

Mine Frm: Sidney Ward

100 TON FLOT MILL, Wallace Creek

Mg dist,

Mill Supt: J R Bartlett

### HYDER MINES INC

904 4th Ave, Seattle 4

Pres: Donald McNeilly

VP: Edward R Wheat

Sec-Treas: J W Boothe

Purch Agt: Dr R L Camber

(See Alaska)

### INDUSTRIAL MNG INC

RR 3 Box 260, Sedro Woolley

Pres: F P Nelson

VP: G W Wright

Sec-Treas: Nellie Nelson

MINE, Twin Sisters area, Cr

Under devel

### INDIAN EMPIRE MINING CO

Marine Drive, Port Angeles

Pres: E R Gehrie

VP: E M Fitzgerald

Sec-Treas: M E Oldring

Gen Mgr & Gen Supt: Elder C Lucier

Purch Agt: E R Gehrie or E Lucier

HURRICANE #1 & ED "B", Box 44,

Port Angeles, surface, Mn

Under devel

150 TON GRAV & LEACHING MILL,

C to E Sts, Marine Dr, Port Angeles

Mill Supt: E C Lucier

### ISABELL CONST CO

Box 2351, Reno, Nev

MIDNIGHT MINE, Spokane Indian

Reservation, contract mg for Dawn

Mg Co

Supt: John Amerson

(See Ariz, Idaho, Nev, Utah)

### KASLO MINES CORP

401 Empire State Bldg, Spokane 1

Pres & Gen Mgr: H G Loop

VP & Ass't Gen Mgr: E D Thompson

Sec-Treas: E I Fisher

KASLO MINE, in Canada (Howser, BC)

### KNOB HILL MINES, INC

206 Sansome St, San Francisco, Calif

Pres: H N Kuechler, Jr

VP: A R Patterson

Sec: D D Farley

Treas: L E Hellar

KNOB HILL MINE, Republic, undergr.,

Au, Ag

Mine Supt: J E Davis

Mine Frm: F E Jordan

Mine Eng: L R B Atwater, Jr

400-TON FLOT MILL, Cyanidation

of tailings

Mill Supt: Louis Leibek

Mill Frm: R A Kelts

Mill Assay: A D Brenner

### L & N MINING CO

1129-10th Ave N, Seattle 2

Pres & Gen Mgr: W J Logus

VP: V R Newbury

Sec-Treas: M A Logus

Geo: Forbes Robertson

(See Nev)

### LASOTA JONES CO

Metaline Falls

MINE, Pend Oreille County, State

Ck dist, Zn, Pb

Under devel

### LITTLE KING TUNGSTEN MINE

Box 384, Deer Park

LITTLE KING TUNGSTEN MINE,

Blue Grouse Mt., WO<sub>3</sub>

Mgr: W H West

Prod: 12-15 tons

25-TON GRAV MILL, at mine

### LOVITT MNG CO, INC

Box 1668, Wenatchee

Pres: E H Lovitt

VP: Vere McDowell

Purch Agt: David Morree

GOLD KING MINE, 3 mi S of

Wenatchee, undergr. & surface, Au,

Ag, silica

Mine Frm: Ben Richards

Mine Eng: Oscar Thompson

Prod: 250 tons

### MARCEAR, TED & AL (LESSERS)

Urbana

ACE OF DIAMONDS MINE, Au

Under devel

### MARTY, JOHN & MEDDOCK, MARTIN

Rice

AGUILA LEAD SILVER MINE, Ag,

Cu, Pb

Under devel

### MINERAL GORGE MNG & DEVEL CO, INC

301 S Monroe St, Tacoma 5

MINE, Snohomish County, Index dist,

Cu, Au, Ag

Under devel

### MUDHOLE EXPLOR, INC

712 Hutton Bldg, Spokane 4

Pres & Gen Mgr: Adolf Nissen

VP: Ralph E Umbreit

Sec-Treas: Duane H Watters

EXPLOR., surface, U<sub>3</sub>O<sub>8</sub>

Under devel

### NEW RAINBOW MNG CO

447 Peyton Bldg, Spokane 1

WEBER MINE, in Idaho

(See Idaho)

### NEW WELLINGTON MINES, LTD

404 Montreal St, Victoria, B.C.

Carlsbad

BEAR CREEK MINE, Clallam

County, Mn

(Closed during winter)

### NEW YORK - ALASKA GOLD DREDGING CORP

1616 Smith Tower, Seattle, Wash

Pres & Man Dir: J K Crowley

VP: G G C King

Sec: Leise G Robbins

Treas: Fannie Barley

Purch Agt: L E Robbins

(See Alaska)

### NORTH STAR URANIUM, INC

417 Paulsen Bldg, Spokane 1

Pres: John F Campbell

VP: A F Larson

Sec: A C Townsend

Treas-Purch Agt: Sam Farber

LEMBRECHER LEASE, Spokane

County, U<sub>3</sub>O<sub>8</sub>

Under devel

### NORTHERN PLAINS EXPLOR CO

640 Seventh Ave, W, Calgary,

Alberta, Canada

DEER, TOGO & TURK MINES, Deer

Trail dist, Stevens County, Ag, Cu

Under devel

### NORTHWEST MAGNESITE CO

Chewelah

Pres: E A Garber

VP: C A Sargent

Sec-Treas: G Stivers

Gen Mgr: H & Ziebell

Plant Supt: Barney Endrice

Plant Eng: Clyde Holen

Purch Agt: L A Knight

RED MARBLE MINE, 20 mi SE of

Chewelah, surface, magnesite

Min Supt: Roger L Fisk

Mine Frm: Lloyd King, John Estes

Min Eng: J Brammer

Prod: 2,000 tons

3,000-TON FLOT MILL & HEAVY

MACHINES

Mill Supt: T W Morton

### NORTHWEST MINERALS INC

730 Peyton Bldg, Spokane 1

Pres: Forrest M Garrett

VP: H E Besly

Sec-Treas: Don A Gillis

Purch Agt: Don A Gillis

WYNCOOP LEASE, Wellpinit,

undergr., U<sub>3</sub>O<sub>8</sub>

Cons Eng: Sam Richardson

Fld Geol: David M Berry

Explor

(See Idaho)

### NORTHWESTERN MNG CO

P O Box 3791, Seattle 24

(See California)

### NORTHWEST REFIN & CHEM CO

N 125 Park Rd, Spokane 62

Pres: Wm Melander

VP: Leo Teller

Sec-Treas: John A Allen

CUSTOM SMELTER, Dishman

Smelter Supt: Wm Burkhardt

Prod: 6,000,000 lbs Zn oxide yrly

### NORTHWEST URANIUM MINES, INC

Box 1088, Wallace, Idaho

Pres: F E Scott

VP & Gen Mgr: Clark L Wilson

Sec: Alden Hill

Treas: Jack D Gay

NORTHWEST URANIUM MINES,

E 3723 15th Ave, Spokane, open pit,

U<sub>3</sub>O<sub>8</sub>

Gen Supt: Geo L Cleward

Prod: 400 tons

400-TON FLOT MILL, Wellpinit

acid

Under constr

PETER'S LEASE, Spokane, Indian

Reservation, open pit, U<sub>3</sub>O<sub>8</sub>

Under devel

### OLYMPIC MANGANESE MNG CO

1129 10th Ave North, Seattle 2

Pres & Gen Mgr: W J Logus

Sec-Treas: M A Logus

TUBAL-CAIN MINE, 15 mi W of

**SAGINAW GOLD & COPPER MINES INC**  
500 Gladstone St., Bellingham  
Pres: L A Averill  
VP: Joe Westhoff  
**SAGINAW MINE**, Whatcom County,  
Cu, Au, Ag  
Under devel

**SENUCO INC**  
300 Fidelity Bldg, Spokane  
(for Box 844, Davenport)  
Pres: O L Nichols  
VP: Dave Nogle  
Sec: Lorella Nichols  
Treas: Frank Case  
**SENUCO NO 1 MINE**, 8 mi N of Orient,  
Surface, U<sub>3</sub>O<sub>8</sub>  
Under devel

**SHERMAN MNG CO**  
Rt 1, Box 243, Omak  
Pres: C C Sherman  
VP: W E Sherman  
Sec-Treas: T H Hohn  
**SHERMAN MINE**, Okanogan County,  
Fb, Zn, Au  
Under devel

**SILVER DOLLAR MNG CO**  
900 W Sprague Ave, P O Box 122  
Spokane 19  
Pres: Elmer E Johnston  
VP: Leigh E Nichols  
Sec-Treas: W J Anderson  
Purch Agt: W J Carlson  
(Property oper by the Sunshine Mng Co & Polaroid Mng Co)  
(See Idaho)

**SPOKANE-IDAHO MNG CO**  
611 Peyton Bldg, Spokane 1  
Pres: Frank N Marr  
Sec: C D Randall  
Treas: Charles E Marr, Jr.  
(See Idaho)

**SUNSHINE MNG CO**  
738 Peyton Bldg, Spokane 1  
Pres: Robert M Hardy  
VP: C M Hull  
Sec-Treas: Frank M Hardy  
Asst Sec: St anton B Bennett  
Asst Treas: Vincent P Whelan  
Gen Mgr, Mng Div: John Edgar  
Gen Mgr, Petroleum Div: A F Wyman  
(See Idaho, Utah, Ariz)

**TREASUREMONT MNG CO**  
1129 10th Ave N, Seattle  
Pres & Gen Mgr: W J Lucas  
Sec & Treas: M A Logus  
(See Idaho)

**TWIN SISTERS MAGNESIUM & CHROME CORP**  
1101 Terminal Sales Bldg, Seattle  
Pres: Alwyn H Wild  
Exec VP: A L Atherton  
Sec: Marian Wild  
Mng & Research Dir: George H Beers  
**MINE**, Skagit County, open pit,  
Cr  
Under devel  
200-TON GRAV MILL, Hamilton  
(Planning underway)

**UTAH CAN INC**  
1831 E Sprague Ave, Spokane 31  
Pres: L L Lorang  
VP: Gordon Berkhaug  
**RUSHMEIR LEASE**, Pend Oreille  
County, Fb, Zn, Ag, Au  
Under devel

**VICTORY MINES CORP**  
Lloyd Bldg, Seattle 1  
Pres: J F Brand  
VP: Joe F Krom  
Sec-Treas: Theo E Dow  
**KROMORNA MINE**, Sultan, undergr,  
Cu, Au, Ag, WO<sub>3</sub>, Mo  
Gen Mgr: J F Krom  
Met: W H Marquette  
Mng Supt: B Y Thorp  
Consult Eng: W A Richelson  
100 TON FLOT MILL, at mine  
Mill Supt: W H Marquette  
Under devel

**WAR EAGLE MNG CO, INC**  
312 S 9th St, Yakima  
Pres: Russell E Peterson  
VP: Virgil L Packer  
Sec-Treas: E Walter Peterson  
Purch Agt: E W Peterson  
11 CLAIMS, Copper Creek Mng dist,  
Yakima County, Mo  
Under devel  
(See Idaho)

**WESTERN GOLD MINING, INC**  
712 Joseph Vance Bldg, Seattle  
Pres: Harry Kramer  
**NEW LIGHT MINE**, Whatcom County,  
Au, Ag  
100-TON FLOT MILL

**WESTERN RESOURCES CORP**  
P O Box 588, First & Main,  
Lodi, Calif  
**LYONS HILL SILICA DEPOSIT**, 9  
mi from Springdale, Silica  
Prod: 70 tons  
(Mine is operated by contract)

**WESTERN URANIUM MINES, INC**  
730 Peyton Bldg, Spokane 1  
Pres: William Winkler  
VP: William Tanke  
Sec & Gen Mgr: Don A Gillis  
Treas: E J Minnigh  
Consult Eng: Sam H Richardson  
**SHERWOOD LEASES**, Wellpinit,  
Spokane Indian Reservation, open  
pit, U<sub>3</sub>O<sub>8</sub>  
**SNIVEY LEASE**, Milan, (Mt Spokane)  
**WILLMORE LEASE**, Wellpinit, U<sub>3</sub>O<sub>8</sub>  
Explor

**WIATRAK MNG & DEVEL CO, INC**  
5002 Ivanhoe Pl N E Seattle  
Pres: Paul A Wiatrak  
VP: John Sherman  
Sec-Treas: John Erickson  
**COPPER BELL MINE**, Goldbar, Cu  
Under devel

**WIND RIVER MNG CO**  
205 E 12th St, Vancouver  
Pres: Everett N Phillips  
MINE, Skamania County, Paradise  
dist, Au, Ag  
Under devel

## WEST VIRGINIA

**MEADOWBROOK CORP**  
Spelter  
Pres: H D Carus  
VP: H A Gronemeyer, A C Carus  
Sec-Treas: C R MacBrayne  
Purch Agt: T S Stuart  
**RETORT SMELTING**, Spelter  
Sup: H A Gronemeyer  
Asst Sup: T R Ferguson  
Prod: 40,000 tons slab Zn yrly

## WISCONSIN

**AMERICAN ZINC, LEAD & SMELTING CO**  
1515 Paul Brown Bldg, St Louis  
Mo  
**VINEGAR HILL DIVISION**  
MINE, Shullsburg, undergr, Zn, Pb  
Hg  
(See Aris, Ill, Mo, Ohio, Okla, Tenn,  
Tex, Utah, Wash)

**CUBA MNG CO**  
Platteville  
Treas: A W Heins  
Mgr: J P Lache  
PROPS, nr Mineral Point & New  
Digging  
Idle

**EAGLE PICHET CO, THE MNG & SMELTING DIV**  
Galena, IL  
Gen Mgr: R L Haffner  
Gen Supt: H H Haman  
Geol: H Calloway

Met: Albert Thayler  
Main Supt: Tom Ray  
Mgmt Fmn: Clarence Lyden  
Mine Supt: E L Honey  
Mill Supt: C C Crow  
**SHULLSBURG MINE & MILL**,  
Shullsburg, As, Pb  
Prod: 1,200 tons

**BIRKETT MINE**, Hazel Green, Za  
Prod: 500 tons  
**LINDEN MINE**, Linden, Za  
Prod: 300 tons  
**LINDEN MILL**, Linden  
Prod: 500 tons  
(See Ill, Kas, Nev, Okla, Okla)

**MIFFLIN MNG CO**  
Box 132, Mifflin  
Owner: Herb Turner  
**COKER, BICKFORD MINES**, undergr,  
Zn, Pb  
Gen Mgr: John F Howland  
200-TON GRAV-FLOT MILL  
Mill Supt: G H Pett  
Idle

**MONTREAL MNG CO**  
Minerals  
Gen Supt: C A Bjork  
Supt: D S Young  
Asst Supt: R H Holgers  
Purch Agt: C F Guenther  
Master Mech: Leo R Arducant  
Elec Eng: James Thomas  
Mech Eng: W W Viebahn  
**MONTRÉAL MINE**, 4 mi W of Hurley,  
undergr, Fe  
Prod: 3,850 tons daily  
(See Oglebay-Norton & Co, Ohio)

**NEW JERSEY ZINC CO, THE**  
Box 217, Plateville  
**EXPLORATION STAFF**  
Res Geol: J M Hague  
Geol: Wayne Zwickey  
(See Calif, Colo, N J, N Mex, N Y,  
Pa, Tenn, Va)

**NEW TEASDALE MINE**  
Rt 2, Cuba City  
Mgr: George Rooney  
MINE, near Benton, undergr, Zn  
Idle

**PICKARDS MATHER & CO**  
**ODANAH IRON CO**  
**CARY MINE**, Hurley, undergr,  
Supt: J C Wangard  
Asst Supt: B W Carey, Jr  
(See Mich, Minn)

**PIQUETTE MNG & MLG CO**  
Box 4, Plateville  
Mgr: F B Piquette  
Geol: Harold Davis  
**PIQUETTE NO 1 MINE**, 15 mi W of  
Plateville, undergr, Zn, Pb  
Mine Supt: Bernard Murray  
Prod: 350 tons  
350 TON GRAV-FLOT MILL  
Mill Supt: John Knebel

## WYOMING

**ALJOB MNG CO**  
Thermopolis  
**HOLDINGS**, Gas Hills area, Fremont  
County, U<sub>3</sub>O<sub>8</sub>

**AMERICAN COLLOID CO**  
Merchandise Mart Plaza, Chicago  
54, Ill

Pres: Paul Bechtner  
VP: William D Weaver  
Asst Sec-Treas: Jeannette Salmon  
Purch Agt: Arthur G Clem  
**UPTON MINE**, Upton, open pit,  
bentonite clay  
Gen Mgr: Orville Horn  
Asst Gen Mgr: Donald Horn  
Prod: 250 tons  
250-TON MILL, Upton, drying and  
grinding  
(See Ill, Miss, SD)

**ANSCHUTZ DRILLING CO, INC**  
1411 Mile High Center Bldg,  
Denver, Colo  
**FLY GROUP**, Converse County,  
undergr, open pit, U<sub>3</sub>O<sub>8</sub>  
(See Colo)

**ANTELOPE MINES**  
Box 341, Riverton  
Mgr: N P Juneman  
**MINES**, Riverton  
Geol: L A Henderson  
Under devel

**ATLANTIC WESTERN MNG CO**  
South Pass Route, Lander  
**DUNCAN MINE**, undergr, Au  
50 TON FLOT MILL  
Under devel

**BALL & DITTMER**  
P O Box 164, Bell Gardens, Calif  
Own: Grace D Ball, H W Dittmer  
**COLUMBUS MINE**, Pumpkin Buttes,  
Gillette, open pit, U<sub>3</sub>O<sub>8</sub>, V<sub>2</sub>O<sub>5</sub>  
Idle

**BARCO MINERALS INC**  
Box 432, Sturgis, South Dakota  
Pres: Richard B Williams  
VP: M H Braden  
Sec-Treas: Ruth I Williams  
**SPOOKY JOE**, Hulett, Crook County,  
open pit, U<sub>3</sub>O<sub>8</sub>  
Mine Supt: M H Braden  
Geol: W J Lang, F R Williams  
Under devel

**BENTON CLAY CO**  
P O Box 432, Casper  
Pres: Fred Carr  
VP & Gen Mgr: I Kreiner  
Sec-Treas: Henry Burgess  
**BENTONITE MINE**, Natrona County,  
placer  
Gen Supt: R E Goering  
Geol: Fred Carr  
Mech Eng: R E Goering  
MILL, Casper

**BLACK HILLS BENTONITE CO**  
Moorecroft  
Pres: H T Thorson  
Gen Mgr: A C Hardinge  
**MINE**, Moorecroft & Upton  
surface, bentonite  
Mine Supt: W A Robinson  
Prod: 200 tons  
180-TON MILL, drying & grinding  
Plant Supt: Boyd Ash

**CARBON URANIUM CO**  
915 8th Third St, Laramie  
Pres: George Leiber  
VP: Charles Walby  
Sec: Nina G Downs  
Treas: G M Merrick  
**ALPHA & CHICAGO CLAIMS**, Baggs  
Explor

**COLORADO FUEL & IRON CORP**  
Sunrise  
**SUNRISE MINE**, undergr, Fe  
Supt: M L Sisson  
Asst Supt: R L Wahl, Jr  
Eng: H B Lynch  
Ch Elec: R E Davis  
Ch Chem: H A Robb  
Mine Firm: A E Testolin  
Prod: 3,100 tons  
(See Colo, Utah)

**CONTINENTAL MATERIALS CORP**  
820 South 9th, Grand Junction,  
Colo  
**MINES**, Crooks Gap, open pit &  
undergr, U<sub>3</sub>O<sub>8</sub>  
Gen Supt: Herbert Reynolds  
(See Colo, Utah)

**COPPER KING MNG CO**  
**COPPER KING MNG CO**  
Box 621, Cheyenne  
Pres: Harry E Ferguson  
VP: Andy E Roedel  
Sec: P W Dinneen  
Treas: Harry Euckman  
**COPPER KING MINE**, 22 mi W of  
Cheyenne, open pit, Cu, Au, Ag, Ti  
Mine Eng: T L Johnston, (Laramie)  
Under devel

**CRYSTAL CREEK GYPSUM CO**  
243 W Main St, Lovell  
Pres: Alfred Deschenes  
VP: Herbert Daniels  
Sec-Treas: H M Deschenes  
**CRYSTAL CREEK GYPSUM MINE**,  
Crystal Creek and Himes, open  
pit, gypsum  
Under devel

**FEDERAL URANIUM CORP**  
248 S Main St, Salt Lake City, Utah  
Pres: Ralph W Neyman  
**MINE**, Gas Hills, U<sub>3</sub>O<sub>8</sub>  
Under devel

**FOUR CORNERS URANIUM CO**  
P O Box 1749, Grand Junction, Colo  
VP: Dr E L Clark  
**MINE**, Gas Hills, U<sub>3</sub>O<sub>8</sub>  
(See Utah and Largo Uranium Corp,  
N Mex)

**FREMONT MINERALS, INC**  
517 Farmers Union Bldg, Denver  
Exec VP: Allen D Gray  
Sec-Treas: W H Hoagley  
Prod Mgr: G T Bator  
500 TON MILL (Acid-carbonate-  
solvent extraction) Riverton  
Mill Supt: G H Bryant  
(under const)

## Wyoming

### GLOBE MNG CO

Box 1186, Casper  
Pres: H D Hand  
VP: Page T Jenkins  
Sec-Treas: H Wayne Ashcraft  
Purch Agt: E L Lockhart  
**GLOBE MINE**, Riverton, Converse  
County, open pit,  $U_3O_8$   
Supt: E L Lockhart  
Geol: Richard Bagan  
Asst Supt: Charles Perkins  
Prod: 40 tons

### GREEN RIVER OIL & URANIUM CO

20 W Broadway, Salt Lake City,  
Utah  
**MINE**, Gas Hills, Fremont County,  
 $U_3O_8$   
idle  
(See Colo., Utah)

### HAMLIN EXPLOR & MNG CO

P O Box 432, Edgerton  
Pres & Gen Mgr: Wm C Hamlin  
VP: Robert G Hamlin  
Sec: Clyde H Hamlin  
**HAMLIN-CONFORD MINE**, Edgerton,  
surface,  $U_3O_8$ ,  $V_2O_5$   
Explor Drilling

### HOMESTAKE MINING CO

400 Bush St, San Francisco 4,  
California  
**PROPERTIES**,  $U_3O_8$   
Under devel  
(See Calif., N Mex, S D, Utah)

### HUGHES MNG CO

520 E Main, Riverton  
Owner: Vern Hughes  
**PAT-N-BILL MINE**, Gas Hills, 2 1/2  
mi E of Lucky Mt, open pit,  $U_3O_8$ ,  
 $V_2O_5$   
(See Two State Uranium Co., Wyo.)

### INTERMOUNTAIN CHEMICAL CO, CHLOR - ALKALI DIVISION (Subsidi of FOOD MACHIN & CHEM CORP)

Box 872, Green River  
Div Pres: F A Gilbert  
Purch Agt: R T Guest  
**WESTVACO MINE**, undergr, trona  
Gen Mgr: H E McDonald  
Asst to Gen Mgr: R F Love  
Gen Supt: J R Jacobucci  
Mech Eng: H F Young  
Elec Eng: L Ruffini  
Process Supt: W C Bauer  
Mine Supt: T S Bernatis  
Asst to Mine Supt: G R Radomsky  
Mine Prm: W F Peters  
Mine Eng: W Z Wenneberg  
2000-TON MILL, at mine  
solution & recrystallization  
Mill Supt: R Kvirdahl  
Mill Prm: R Bruce  
(See Barium Prod, Ltd, Calif, Nev  
& Food Machin & Chem Corp, Calif)

### INTERNAT'L MINERALS & CHEM CORP, EASTERN CLAY PRODUCTS DIV

Box 451, Belle Fourche  
S Dakota  
**MINE**, Crook County, surface,  
bentonite  
Mgr & Purch Agt: K L Arthur  
**MILL**, Belle Fourche, S Dakota  
(See Ariz, Colo, Fla, Ill, Mo, Miss,  
N Mex, N C, Okla, S Dak, Tenn, Va)

### KATE MINERAL INC

Suite 314, Centennial Bldg,  
1845 Court Place, Denver 2, Colo

### DUBOIS URANIUM 1-6

Dakota,  $U_3O_8$

Mine Supt: David Haderham

idle during winter

### KERR McGEE OIL INDUSTRIES, INC

Kerr McGee Bldg, Oklahoma City,  
Oklahoma

### URANIUM Prod

(See Ariz, N Mex, Okla)

### LEVI COMPANY

205 E 12th St, Casper  
**MINE**, Gas Hills, open pit,  $U_3O_8$   
Mgr: Jack Ellis

### LISBON URANIUM CO

310 First Security Bldg,  
Salt Lake City, Utah  
Pres: A P Kibbe

**MINE**, at Little Mt, open pit,  $U_3O_8$   
(See Mont, Colo, N Mex)

### LITTLE MO MNG INC

Uptown  
Pres & Gen Mgr: Allan D Douglas

### JP John Kummerfeld

See: Earl Cox  
Trees: J E Ackerman  
**MINE**, Shoehorn, 25 mi NE of  
Shoehorn, open pit,  $U_3O_8$ ,  $V_2O_5$   
Geo-Eng: Earl Cox  
Supt: Millard Dickey

### LUCKY MINE URANIUM CORP

807 Walker Bank Bldg,  
Salt Lake City, Utah  
Pres: Allen D Christensen  
Exec VP: E E Littlefield  
VP: Neil McNeice

Sec: Roger Cranmer

Treas: J M Horrocks  
**LUCKY MCNINE**, Masonic Temple  
Bldg, Riverton, 20 mi E of Riverton,  
Gas Hills Min dist, open pit,  $U_3O_8$   
Gen Mgr: A V Quine

Geo: Don C Anderson  
Mech Eng: Louie H Morfeld  
Met: Robert Porter  
Under devel

750-TON MILL, Gas Hills field  
column exchange  
Under constr

Project Mgr: John S Anderson  
Mill Supt: Ian Ritchie  
Mine Supt: S A Hotman  
Cone Met: Robert Porter  
(Operated by Utah Mng Co)

### MAGNET COVE BARIUM CORP

Box 832, Greybull  
Div Mgr: Lee Grenier  
**MINE**, 8 mi E of Greybull, surface,  
bentonite  
250-TON MILL, drying & grinding  
Mill Supt: John M Copenhaver

### MAGNETITE PROD CORP

Westland  
Sec-Treas: Parr Merriman  
**MINE**, Albany County, open pit, Fe

### NATIONAL LEAD CO, BAROID DIVISION

Osgage  
**CLAY SPUR PLANT**  
Mine & Mill Supt: Joe Roesteli  
**MINE**, surface, bentonite  
PLANT, dry grinding  
**COLONY PLANT**  
Mine & Mill Supt: D K Rowand  
**MINE**, surface, bentonite  
PLANT, dry grinding  
Supt: J H Loth  
(See Ark, Calif, Kans, La, Mo, Mont,  
N Y, Tenn, Tex)

### OLD FAITHFUL URANIUM CORP

P O Box 166, Ft Collins, Colo  
Pres & Gen Mgr: C M Buescher, Jr  
VP: Clifford Randell

Sec-Treas: Raymond I Demnick  
**CANNON BALL MINE**, Douglas,  
open pit,  $U_3O_8$ ,  $V_2O_5$   
Asst Gen Mgr: James A Smathers

Mech Eng: J H Mair  
Mine Prm: Cal Gurwell  
Prod: 50 tons

**MINE**, Lance Creek area, open pit,  
 $U_3O_8$ ,  $V_2O_5$ , selenium  
Under devel

### PETERSON, RICHARD L

Box 8, Douglas  
Part: Bruce Anderson  
**CERESITE #1 MINE**, Douglas, undergr,  
Muscovite  
Mine Supt & Geol: C J Tempain  
Under devel

### PIVOT ROCK MNG CO

780 37th St, Los Alamos, N Mex  
Pres: James N Wearin  
Sec: Gordon S Erickson  
Treas: Harold G Griffith  
**MINES**, Sec 15, T37N, R73W,  
Converse County, surface  
Sec 10 & 19, T38N, R80W,  
Fremont County, surface

### PLUMLEY CONST & MNG CO

Box 588, New Castle  
Pres: Ray D Plumley  
Gen Supt: Sid Marks  
**LOST CANYON MINE**, New Castle,  
undergr,  $U_3O_8$ ,  $V_2O_5$   
Asst Mine Supt: Charles Plumley  
Elec Eng: Randy Wasseen  
Under devel

### PUMPKIN BUTTES MNG & EXPLOR CO

Gillette  
Part: Don Wheeler  
Pres: I J Hauptman

### COLD SPOT MINE, Gillette, at Brown Ranch, open pit, $U_3O_8$ , $V_2O_5$ Gen Supt: Mel Hansen Prod: 8 tons

### QUAD URANIUM CO

Hulet  
Own: James Sheffield, N C McLane,  
Ted R Wagner, Wm Phillips  
**THE QUAD URANIUM MINE**, Hulet,  
open pit,  $U_3O_8$ ,  $V_2O_5$

### RUBY COMPANY

Lander & Laramie

(See J R Simplot Company, Idaho)

### SAN FRANCISCO CHEMICAL CO

Drawer F, Montpelier, Idaho  
**LEPE MINE**, 2 mi NW of Sage  
surface, phosphate  
Mine Supt: Preston S Pugmire  
Mine Prm: Frank Buck  
Prod: 1,000 tons  
(See Idaho, Utah)

### SHAWANO DEVEL CORP

1445 Court Pl, Denver 2, Colo  
**MINE**, Baggs, in Poison Basin area  
W of Baggs, open pit,  $U_3O_8$ ,  $V_2O_5$   
Gen Supt: Dean Pospisal

Met: Walter C Spence  
Prod: 50 tons

### SHIRLEY MOUNTAIN MNG CO

520 E Main, Riverton  
Managing Part: S J Stanbury  
**MINE**, Bald Mountain at S edge of  
Shirley Basin, open pit,  $U_3O_8$ ,  $V_2O_5$

### SHONI URANIUM CORP

520 E Main, Riverton  
Pres: Vern Hughes  
VP: Roy Peck

Sec-Treas: Stanford E Clark  
**MINE**, Gas Hills, open pit,  $U_3O_8$ ,  
 $V_2O_5$   
Geo: Bob Ford & L Boush  
Under devel

### J R SIMPLOT COMPANY

Executive Office, Continental  
Bank Bldg, Boise, Idaho  
EXPLORATION for Ruby Company,  
Lander & Laramie  
(See J R SIMPLOT COMPANY, Idaho)

### SODAK URANIUM & MNG CO, INC

Evan's Hotel Annex, Hot Springs,  
S Dak  
Pres: Clyde R Boyle  
VP: W E Haldane

Sec-Treas: Paul Russell  
D-85 MINE, Converse County, open  
pit, Mn  
Prod: 25 tons

### ALLRAY LEASE & TURNER LEASE

Explor  
(See S Dak)

### STANBURY MNG CO

520 E Main St, Riverton  
Own: Sam Stanbury  
(See Vega Minerals Co)

### SYL DEL MINE

Gillette  
Own: William F Ramsey  
**SYL DEL MINE**, Gillette, Pumpkin  
Buttes, open pit,  $U_3O_8$ ,  $V_2O_5$   
Geo-Eng: C M Jeppe  
Prod: 30 tons

### TWO STATES URANIUM CO

Bountiful, Utah  
**REDWOOD MINE**, Gas Hills area,  
 $U_3O_8$   
Prod: 1,500 tons per month  
Co-owner with Hughes Mng Co  
(See Utah)

### U S STEEL CORP, COLUMBIA-GENEVA STEEL DIV

120 Montgomery St, San Francisco,  
Calif  
**EXPLOR**, West Wyoming, near Lander  
(See Alaska, Ala, Calif, Minn, Pa,  
Tenn, Utah)

### URANIUM CYCLE EXPL CO

Box 624, Aladdin  
Pres: C Tenderholz  
VP: Fred Hall  
Sec: Lawrence Habuska  
Treas-Purch Agt: W L Jallon

### HILMER & YELLOW STUFF MINE,

Box 624, Aladdin, open pit,  $U_3O_8$   
Mine Eng: A J Katchas  
Prod: 25 tons

### VALLEY DEAN CORP

Box 27, Bountiful  
Pres: Leeland Epperson  
VP: M B Fagen  
Sec: Frank C Neilson  
Treas: Merlin Neilson  
**REDWOOD MINE**, Gas Hills, undergr,  
 $U_3O_8$   
Geo: E C Erickson  
Prod: 150 tons

### VITRO MINERALS CORP

600 W 33rd South St, Salt Lake  
City, Utah  
Pres: C J Potter  
VP: W B Hall  
Sec: W H Denne, Jr  
Treas: R T Ruder

**SATECO PROPERTIES**, Fremont  
County, surface,  $U_3O_8$ ,  $V_2O_5$   
Gen Mgr: J O Horton  
Gen Supt: Roy Coulson

Geo: R D Adamson  
Mech Eng: G Quigley  
Mine Prm: Primo Calabria  
Prod: 300 tons

**VECA MINERALS PROP**, Gas Hills,  
Fremont County, open pit,  $V_2O_5$ ,  
 $U_3O_8$   
Mine Prm: Harvey Christensen  
Under devel  
(See Vitro Uranium Co, Utah)

### WESTERN ENGR CORP

P O Box 8, Douglas  
Pres & Geol: R L Peterson  
VP: Bruce Anderson  
Sec: B J Peterson  
Driller: Virgil Goerke  
Asst Driller: John Townsend  
PROPERTIES, drilling & explor

### WESTERN NUCLEAR CORP

507 W Spruce St, Rawlins  
Pres: Robert W Adams  
Exec VP: Wendell W Ferig  
Sec: Edw A Smyth  
Treas: F O'Neill Griffin  
Purch Agt: Mary Lou Houghton  
Geo: Eric Newman  
Mng Eng: R T Brown  
SMO-BALL MCINTOSH LEASE,  
Crooks Gap, open pit,  $U_3O_8$   
(Prod planned by June 1958 - 50 tons  
daily)  
Under devel

**BULLRUSH MINE**, Gas Hills area,  
open pit,  $U_3O_8$   
Prod: 300 tons

**FRAZIER LAMAC MINE**, Gas Hills  
area, open pit,  $U_3O_8$   
(Prod planned by July 1958 - 350 tons  
daily)

500 TON MILL, Jeffrey City, acid  
leach, R P  
Mill Supt: J W Joyce  
Asst Mill Supt: Marcel Smith

### WESTERN STANDARD URANIUM CORP

520 E Main, Riverton  
Pres: Vern Hughes  
VP: Roy Peck  
Sec-Treas: Stanford E Clark  
Purch Agt: W Hughes  
**BONANZA MINE**, open pit,  $U_3O_8$   
Geo: Bob Ford  
(Prod planned by February 1958 -  
100 tons daily)

### WESTMINSTER CORP

416-20 1st Nat'l Bank Bldg,  
Denver, Colo  
Pres: David E Adams  
VP: Melvyn C Bowles  
VP & Treas: T R Liewellyn  
Sec: Jim T Holman  
**WAGSTAFF LEASES**, Pumpkin  
Buttes area, Campbell County,  
 $U_3O_8$   
(See Ariz, Colo, Nev, Utah)

### WHYNOT PROSPECTING CO

Wagner, S Dak  
Pres: Dick Hinrichs  
Sec: D R Wipf  
**WHYNOT MINE**, Gillette, open pit  
Gen Mgr: A R More

### WYOMING URANIUM CORP

Box 24, Lander  
Pres: Hopkins T Armstrong  
VP: T R Armstrong  
Sec: Beatrice H Armstrong  
DRILLING,  $U_3O_8$

**IRON ORE SHIPMENTS IN GROSS TONS FROM MINNESOTA, MICHIGAN AND WISCONSIN BY COMPANIES AND MINES FOR 1955, 1956 and 1957**

<b>Company Mine</b>	<b>1955</b>	<b>1956</b>	<b>1957</b>	<b>Company Mine</b>	<b>1955</b>	<b>1956</b>	<b>1957</b>	<b>Company Mine</b>	<b>1955</b>	<b>1956</b>	<b>1957</b>
E. C. Bradley & Sons				Haley-Young Mining Company & E. A. Young, Inc.				Pillsbury-Brown			
Bradley	35,989	34,110	26,074	Minnewas	72,128	71,758	59,872	(Douglas)	21,105	26,809	25,067
Charlson Iron Mining Co.				Eldora	106,685	122,376	86,196	Godfrey U. G.	132,560		
Charlson Concentrator	169,310	108,607		Grant			1,306	Plummer	2,191,096	1,782,020	2,106,724
Cleveland-Cliffs Iron Co., The				Total Shipments	178,813	194,634	147,324	Morris Group	17,291	12,006	
Athens-				Inland Steel Company				Midway Group	184,032	58,503	504,619
Bunker Hill	708,341	382,354	399,854	Armour No. 1	209,682	166,702	173,915	Niles (Douglas)	255,637		64,250
Cambria-Jackson	339,084	221,031	176,687	Armour No. 2	106,167	116,485	108,915*	Dormer	473,963	503,928	1,240,543
Cliff Shaft	644,445	656,485	670,883	Morris	335,940	302,710	295,654	Arcturus Group	672,420	101,962	32,059
Humboldt	173,554	212,487	179,185	Greenwood	81,578	63,241	40,756	Mariska Extension	300,103	354,467	341,059
Lloyd	170,900	76,692	865	Sherwood	402,947	393,991	452,088	Leonidas Stockpile	11,731		
Mass	620,489	439,853	353,683	Bristol	324,914	300,564	353,280	McKinley			
Mather	2,787,268	2,339,678	2,502,736	Total Shipments	1,461,228	1,343,693	1,424,108	Union L. O.			
Ohio	139,180	122,401	116,701	Jones & Laughlin Steel Corporation				Stockpile		15,998	13,110
Tilden	101,437	164,883	192,573*	Hill Annex	721,955	603,162	655,147	Franklin		1,913	
Spies	222,994	32,893		Hill Annex Rec-				Hopewell		77,729	110,251
Agnew-Alworth	214,030	50,796	724	lamination Plant				Roucheleau		3,254	
Canisteo	971,349	993,816	467,297	Longyear	828,255	566,794	417,533	Canton (St.			
Hawkins	847,279	800,242	668,667*	Columbia	777,389	664,937	714,604	James)	716,446	695,698	650,956
Hill & Trumbull	737,149	554,924	690,838	Missabe Mountain	50,677	48,850	76,588	Stephens		2,163,954	
Holman-Cliffs	1,070,630	956,548	912,243	Wentworth	175,656	108,973		Embarrass		8,600	
Sally				Schley	219,402	215,133	80,323	Total Shipments	35,119,201	29,069,894	33,473,559
Sargent	74,092	102,393	76,629	Petit	250,857	262,219	549,375	Pacific Isle Mining Company			
Wanless				Graham No. 1		16,902*		Drew-Croxtion-			
Marquette Ore				Graham No. 2		64,782*		Syme	27,591		19,497
Co. Pellets	35,000	226,335		Leetonia		21,940		Emmett	111,263	1,181	
Research Lab.				Tracy		403,604		Graham No. 2	75,454	74,782	22,894
conc.	865			Total Shipments	3,024,191	2,979,296	2,641,326	Uno-Kerr Group	181,086*	157,085*	35,986
Total Shipments	9,822,221	8,400,790	8,100,485	W. S. Moore Company				Missabe Mountain	10,596	14,506	21,583
M. A. Hanna Company				Margaret	71,997	4,758	20,455	North Shiras	8,711	5,401	
Canon	238,075	327,487	731,903	Hanna	22,390			Wasowich	196,239*	153,397	97,296
Hiawatha	613,700	542,187	661,551	Judson	309,371	258,034	38,459	Pacific Isle		39,753	
Homes	459,603	433,554	522,842	Pilot-Annex	91,144	14,366		Alpena L.O.S.P.		16,753	
Watameca	480,820	503,716	394,936	Pilot	3,225			Bradford	26,553	17,919	
Richmond	113,987			Prindle	42,217			Chataco	31,583	50,341	
Bray	714,662	556,624	378,789	Prindle Stockpile	7,512			Holland	8,346	74,740	14,495
Gordon	209,552	640,296	611,483	Yawkey		1,833		Mississippi	46,249	3,555	83,914
Mesaba Chief	477,727	224,367	25,694	Knot	8,122			Pillsbury Trespass	11,120		
Mississippi #3				Stuber	27,525	27,140	3,287	Missouri L.O.S.P.	3,743		
Stein	429,679	101,662	332,547	Norman		1,307	13,141	Albany		2,335	
Enterprise	1,545,634	1,061,892	728,037	Gilbert Silver	35,058			Commodore Group		148,172	
Brunt	15,323	15,323	2,835	Gilbert				Commodore Union Area			
Buckeyes	43,136	50,024	71,871	Alice		2,422		DM & IR L.O.S.P.		2,948	
Impe "B"	106,366		2,882	Graf		3,116	30,015	Iroquois		274,595	
Norpac	125,967	29,206	12,917	Mariiska		2,967	3,991	Meadow		94,722	
Section 18	110,803			Judson Extension	153,303	243,559		Shada		20,892	
Leach				Mariiska Extension		96,744		St. Paul	218,212	126,201	
Douglas	64,577	172,453	123,771	Total Shipments	618,561	486,824	457,422	Genoa-Sparta	8,116		
Duncan	666,348	232,685	336,060	Book				Sidney	4,683		
Argonne	20,908		39,431	Warner				Stevenson	14,452	24,975	
Perry	286,100	494,069	216,966	Leonidas	193,179	137,371	202,125	Susquehanna Retreat	12,748		
Carla No. 2	466,435	33,643	669	Penokee	370,438	511,287	514,059	Victoria		26,605	
Harrison	64,558	137,925	23,827	Fortune Lake conc.		2,261		Winifred		1,403	
North Harrison	100,995	84,276	6,209	Total Shipments	1,016,079	1,067,758	1,148,873	Wistar		5,380	
Harrison B	135,766	127,701	114,144	Oglebay, Norton & Company				Mangan		145,963	
Halebo	70,814	83,261	140,667	Champion	151,364	137,447	172,029	Manuel-West		75,156	
Quinn	398,141	39,611	23,900	Book	143,038	113,158	100,409	Airport		583	
Lot No. 1	46,662			Warner	158,060	166,234	160,251	Merritt		3,364	
Olsen	520,187	496,319	172,334	Leonidas	193,179	137,371	202,125	South Chandler		140,824	
Wyman	179,554	183,487	84,146	Penokee	370,438	511,287	514,059	Wakefield	237,794	49,360	
Patrick Ann	129,099	655,565	691,706	Fortune Lake				Meress			
Patrick Annex	67,772	113,508	138,780	Total Shipments	653,707			Total Shipments	1,317,637	1,564,211	
Kevin	175,866	76,926	47,578	Oliver Iron Mining Division				Pickands Mather & Company			
Kevin B	166,597			West Davis-Geneva				Zenith	413,094	355,784	384,924
Patrick B	583			Pioneer U. G.	670,011			Erie	189,724	227,994	265,172
Patrick C	48,995			Soudan	208,544	205,809	157,405	Embarra	1,046,434	672,583	726,603
Galbraith	42,568			Mountain Iron				Biwabik	238,743		
Aromac	103,574	91,104	94,459	Group	1,115,486	545,952		Albany	345,136	321,566	370,927
MacKillop	92,065	488		Roucheleau				Scranton	799,859	529,031	459,095
Wegman	343,256	326,648	266,710	Group	5,841,415	5,212,154		Mahoning	2,023,299	1,805,103	1,719,937
Wegman So.				Roucheleau				Carmi	454,703	444,913	560,770
Longyear	91,133			Group (incl.)				Bennett	601,178	493,175	468,322
South Agnew	663,580	744,716	669,999	Saint	329,372			Danube	708,077	615,800	600,264
South Agnew No. 2	405,634	440,220	404,162	Spruce Group	1,496,077	1,076,151	570,740	West Hill	760,071	628,431	665,642
Morton	624,678	379,826	376,066	Pilotac	1,840,639	1,244,065	651,746	Tioga No. 2	405,749	564,517	742,499
Hillcrest Extension	55,109			Gilbert	632,195	676,797	664,243	Rabbitt Lake	327,770	301,508	303,437
Feigh				Hull-Rust Group	2,100,138	2,124,054	2,296,539	Mahnomen	455,700	343,753	401,013
Huntington	3,057	34,453	6,718	Sherman Group	3,755,504	3,282,332	3,592,036	Coy	302,263	148,940	124,858
South Hillcrest	112,439	77,966	86,230	Monroe Group	6,382,955	5,727,793	5,051,165	Newport	684,809	542,525	603,206
Cuyuna Fee	244,110	305,202	193,878	Pillsbury Group	2,822,454	2,287,916	3,147,100	Peterson	581,678	528,354	487,055
Section 6	15,121		11,102	Kosmer	279,309	178,097	258,386	Geneva	415,841	425,466	561,562
Louise No. 1	11,421	43,464		King Group	1,446,670	1,056,114	1,135,029	Anvil-Palms-	62,908	466,805	558,340
Louise No. 2	103,914			Total Shipments	13,075,767			Keweenaw	543,365	489,956	128,597
Fairmount	15,502			King Group				Sunday Lake	407,222	282,493	439,114
North Yawkey	270,971	10,787						Buck Unit	556,229	422,596	390,084
Spring Valley	275,576	300,570						Fortune Lake	375,509	346,816	139,274
Alstead	240,418							Cornell		35,305	19,001
Rowe	6,804	88,440	111,237					Wade	151,842		
West Alpens	13,860	81,294	11,644					Volunteer	111,356	128,810	88,891
Snyder	25,866	68,400						Loomis	112,478		
South Ann	94,486							Lamberton Annex		6,858	
Campbell D	198,965	27,802	10,728					Lawrence		6,379	
South Alstead	1,715							Total Shipments	11,165,267	11,066,587	
North Hillcrest	5,495							Pioneer Mining Company			
Central Feigh	235,368							Mary Ellen			
Hunner		733,537	1,297,172					(Conc.)	452,152	315,940	131,605
Hunt		345,256	362,802								
South Eddy		299,097	529,135								
East Alpens			95,360								
Gray Reserve			33,776								
Gray Annex			14,032								
Total Shipments	13,988,287	12,461,382	12,882,384								

Company Mine	1955	1956	1957	Company Mine	1955	1956	1957	Company Mine	1955	1956	1957
<b>Republic Steel Corporation</b>				<b>Babbitt Plant<sup>2</sup></b>				<b>Schroeder Mining Company</b>			
Susquehanna	996,926	663,298	604,336	Total Shipments	380,214	3,584,736	5,301,490	Krueger	30,000	74,000	81,540
Stevenson	191,505			Boeing	424,441	344,655	268,263	<b>Snyder Mining Company</b>			
Penokee	13,790			Troy	176,894	152,035	151,418	Webb-Sellers	484,991	532,925	418,662
Tobin Group	262,589	190,929	144,085	Pennington	113,802	5,264	30,843	Whiteside	328,644	383,340	377,867
Total Shipments	1,464,810	854,227	748,421	Carlson-Nelson		37,739	69,741	Shenango	3,600		
E. W. Davis Works				Hillcrest Stockpile	46,999			Godfrey			226,776
Taconite Pellets	380,214	3,584,736	5,018,565	Total Shipments	715,137	584,592	520,265	South Tener	2,228		
								Total Shipments	821,463	916,265	1,023,305

\* Includes tonnage produced for others in trespass operations. 1. Includes 546 tons left in Upper Lake port dock at close of 1956 season. 2. Does not

include 43,806 tons Harvester's Hawkins T. B. fines. 3. Armour No. 2 production hoisted from Armour No. 1 shaft. 4. Mined for Zontelli Bros., Inc., delivered to J & L Steel Corp. 5. Mined for

Pacific Isle, delivered to J & L Steel Corp. 6. Includes mines of the Hedman Mining Company, Pittsburgh Pacific Company, and Bradford Mining Company. 7. Includes Uni-Kerr-Lamberton Area.

## SHORT TONS OF ORE MINED AND SHORT TONS OF WASTE STRIPPED AT REPRESENTATIVE OPEN PIT MINES IN THE UNITED STATES IN 1954, 1955, 1956, AND 1957

Mine	Company	1954		1955		1956		1957	
		Ore Mined	Waste Stripped	Ore Mined	Waste Stripped	Ore Mined	Waste Stripped	Ore Mined	Waste Stripped
Utah Copper	Kennecott Copper Corporation	24,079,400	35,856,651	27,740,000	45,710,091	32,321,100	30,657,533 <sup>1</sup>	30,906,335	32,300,817 <sup>1</sup>
Peter Mitchell	Reserve Mining Company	—	—	—	—	—	—	15,512,487 <sup>4</sup>	—
Morenci	Phelps Dodge Corporation	15,427,147	31,738,176	15,899,410	33,148,792	16,794,287	37,788,263	14,767,611	32,608,512
New Cornelia	Phelps Dodge Corporation	9,128,833	13,730,441	10,274,836	14,663,772	10,112,434	14,304,201	8,813,134	14,014,755
Chino Mines	Kennecott	6,536,058	12,685,603	6,922,950	12,856,067	8,000,001	14,215,786	7,410,927	13,256,722
Benson	Jones & Laughlin Steel Corporation	—	—	—	—	—	—	—	—
Ray Mines	Kennecott	3,657,673	9,268,105	4,818,358	10,204,320	4,603,694	3,370,783	5,110,679	3,624,916
Berkeley Pit	Anaconda Company	—	—	921,279	—	5,852,742	N.A.	4,751,463	N.A.
Lavender Pit	Phelps Dodge	1,651,311	13,676,967	4,433,218	8,013,961	2,132,000	15,402,000	4,892,000	19,095,000
Copper Cities	Miami Copper Company	996,160	7,257,380	4,004,052	3,347,720	5,069,049	6,463,378	4,440,768	5,968,164
Silver Bell	American Smelting & Refining Co.	—	—	—	—	4,167,147	3,869,132	3,482,482	3,037,708
Liberty	Kennecott	—	—	—	—	2,738,650	8,771,600	2,832,600	5,141,480
Eagle Mountain	Nevada Mines Division	—	—	476,096	613,377	2,369,114	719,378	2,710,093	1,177,977
Jacksonville	Kaiser Steel Corporation	1,337,384	2,574,888	3,032,636	3,079,282	2,649,892	4,108,568	2,635,000	N.A.
Pawpaw No. 4	Davison Chemical Company, Div. of W. R. Grace and Company	—	—	2,700,000	—	2,920,000	—	2,440,000	—
Bonny Lake	Davison Chemical Company	446,000 <sup>2</sup>	—	2,373,100 <sup>2</sup>	2,598,400 <sup>2</sup>	2,315,900 <sup>2</sup>	2,683,000	1,979,800	3,219,600
Veteran	Kennecott	459,053 <sup>2</sup>	—	1,393,600 <sup>2</sup>	4,444,900 <sup>2</sup>	1,298,300 <sup>2</sup>	5,540,100	1,806,000	4,010,900
Bagdad	Nevada Mines Division	—	8,927,008	75,157	1,060,467	709,136	10,607,535	1,638,249	10,409,322
Pima	Bagdad Copper Corporation	1,312,086	6,636,612	1,344,489	9,175,745	1,361,870	5,909,888	1,479,034	4,584,861
Nickel Mountain	Pima Mining Company	—	—	624,000 <sup>1</sup>	—	8,849,000 <sup>1</sup>	—	1,133,901	3,119,907
Saline County	Hanna Coal & Ore Corporation	124,547	—	284,416	—	551,656	—	1,016,596	—
Gay	Aluminum Company of America, Mining Div.	N.A.	N.A.	N.A.	N.A.	779,130 <sup>2</sup>	—	834,082 <sup>2</sup>	—
Saline County	J. R. Simplot Company	610,604	937,000 <sup>1</sup>	791,961	223,678 <sup>1</sup>	755,000	888,615 <sup>1</sup>	830,400	1,368,210 <sup>1</sup>
Conda Pit	Reynolds Mining Corporation	—	—	519,431	1,838,012	496,698	1,519,724 <sup>1</sup>	135,230	789,021 <sup>1</sup>
Van Stone	Anaconda Company	—	—	—	—	189,000	272,000 <sup>1</sup>	293,000	642,000 <sup>1</sup>
Anderson Pit	American Smelting & Refining Company	355,626	528,182	380,324	620,033	367,441	613,780	200,979	134,721
Centennial	Montana Phosphate Products Company	—	—	—	—	116,038	491,402 <sup>1</sup>	117,546	330,025 <sup>1</sup>
Northgate	J. R. Simplot Company	—	—	—	—	86,909	179,740 <sup>1</sup>	114,034	209,885 <sup>1</sup>
Rattlesnake	Ozark-Mahoning Company	—	—	—	—	104,737	—	91,462	—
Idaho-Almaden	Continental Materials Corporation	—	—	7,397	—	8,453	2,551,000 <sup>2</sup>	58,890	—
Sun Valley Barite	Rare Metals Corporation of America	—	—	—	—	58,101	—	57,836	—
Tungsten	J. R. Simplot	37,692	382,474	35,056	414,185	16,277	30,900 <sup>2</sup>	48,937	58,686 <sup>1</sup>
Three Kids	Nevada Minerals Inc.	257,532	77,204	393,088	729,420	455,852	8,368,851	30,401	111,567
Seismic Pit	Continental Materials Corporation	N.A.	N.A.	N.A.	N.A.	68,860	272,500 <sup>1</sup>	4,882	105,500
Getchell	Getchell Mine Inc.	N.A.	N.A.	48,160	255,700 <sup>1</sup>	1,522,197 <sup>2</sup>	2,290,380 <sup>2</sup>	2,330	4,000 <sup>1</sup>
Kimberley	Kennecott	Nevada Mines Division	N.A.	N.A.	N.A.	1,368,143	—	3,879	—
San Carlos	New Idria Mining & Chemical Company	N.A.	N.A.	N.A.	N.A.	—	—	1,745	—
Wood Heights	Anaconda Company	3,866,775	6,597,000	3,942,161	7,793,905	4,500,000	N.A.	N.A.	N.A.
Sanford Hill	National Lead Company	—	—	—	—	—	—	—	—
Iron Mountain	Columbia Iron Mining Company	1,355,952 <sup>2</sup>	1,917,433 <sup>2</sup>	1,288,617 <sup>2</sup>	1,964,553 <sup>2</sup>	—	—	—	—
Desert Mound	Columbia	975,000 <sup>4</sup>	2,633,000 <sup>5</sup>	1,268,000 <sup>4</sup>	951,000 <sup>4</sup>	1,267,000 <sup>4</sup>	911,000 <sup>4</sup>	N.A.	N.A.
Comstock	Colorado Fuel & Iron Corporation	988,000 <sup>4</sup>	2,850,000 <sup>5</sup>	1,005,000 <sup>4</sup>	1,054,000 <sup>4</sup>	1,233,000 <sup>4</sup>	995,000 <sup>4</sup>	N.A.	N.A.

1. Cubic yards. 2. Long tons. 3. Products sold. 4. Gross tons. 5. Stripping completed in October 1956. 6. Net tons. N.A. Not available.

**SHORT TONS OF ORE MINED AT REPRESENTATIVE UNDERGROUND MINES  
IN THE UNITED STATES IN 1953, 1954, 1955, 1956, AND 1957**

Mine	Company	1953	1954	1955	1956	1957
Climax	Climax Molybdenum Company Div., American Metal Climax, Inc.	6,604,857	8,709,900	9,227,700	9,929,000	10,551,000
San Manuel	San Manuel Copper Company			459,726	5,496,328	8,825,130
Butte Mines	The Ascanada Company					
Copper ore		4,230,567	3,701,677	5,211,401	6,017,000	5,087,000
Zinc ore		1,323,607	915,134	1,091,862	1,094,000	651,000
Manganese ore		471,642	370,288	388,609	420,074	421,074
<b>TOTALS</b>		<b>6,025,816</b>	<b>4,987,099</b>	<b>6,691,872</b>	<b>7,481,000</b>	<b>6,159,000</b>
Southeast Missouri	St. Joseph Lead Company	5,377,405	5,738,700	4,994,221	5,972,884	6,038,785
Miami	Miami Copper Company	3,705,113	3,413,914	3,721,675	3,812,165	3,455,120
Calumet Division	Calumet & Hecla, Inc.	2,009,262	1,939,329	1,406,671	2,060,849	1,731,385
Homestake	Homestake Mining Company	1,368,059	1,485,226	1,550,116	1,627,719	1,659,705
Tennessee mines	American Zinc Company of Tennessee					
No. 2		553,700	533,318	466,962	485,959	488,394
Young				16,920	222,115	359,415
Grasselli		268,934	42,516	163,848	181,959	182,598
North Friends Station		135,683	173,938	118,906	106,504	114,655
Athletic		22,949	8,747	25,339	17,238	0
Coy						21,396
<b>TOTALS</b>		<b>1,013,969</b>	<b>758,519</b>	<b>781,975</b>	<b>1,013,663</b>	<b>1,166,458</b>
Cornwall	Bethlehem, Cornwall Corporation			1,737,610 <sup>a</sup>	1,381,281 <sup>b</sup>	1,425,079 <sup>c</sup>
Tri-State Mines	Eagle-Picher Company			1,730,696	1,606,974	1,731,851
Sunrise	Colorado Fuel & Iron Company	603,730 <sup>d</sup>	492,304 <sup>e</sup>	838,692 <sup>f</sup>	725,496 <sup>g</sup>	786,548 <sup>h</sup>
Pend Oreille	Pend Oreille Mines & Metals Company	300,040	482,052	503,391	587,891	757,197
Minnesota Hi	Kennecott-Nevada Mines Div.				390,175	720,768
Illinois-Wisconsin	Eagle-Picher Company				723,851	679,473
Westvaco	Intermountain Chemical Company				596,753	671,652
Copper Queen-Bisbee	Phelps Dodge Corporation	576,658	600,310	546,001	632,088	630,068
All mines	America Zinc, Lead & Smelting Company					
Grandview		234,250	113,502	194,999	209,089	228,352
Nellie B. Division		782,888	880,265	971,175	361,872	148,879
Vinegar Hill Division				45,912	145,231	91,252
Piquette Joint Venture				54,046	96,491	91,181
<b>TOTALS</b>		<b>1,020,623</b>	<b>993,767</b>	<b>1,266,133</b>	<b>812,683</b>	<b>559,604</b>
Balmat	St. Joseph Lead Company Edwards Division			551,320	539,530	551,299
Bunker Hill	Bunker Hill Company	407,112	411,900	528,833	531,334	521,041
Tri-State	National Lead Company			749,024	771,450	502,075
Treasury Tunnel-Black Bear	Idarado Mining Company	260,200	267,250	274,550	480,000	457,850
Magma	Magna Copper Company	431,749	463,915	458,488	453,683	442,134
Reeves MacDonald	Pend Oreille Mines & Metals Company				400,204	405,531
Madison Mines	National Lead Company			293,165 <sup>i</sup>	355,782	354,764
Shullsburg Unit	Eagle-Picher Company				363,300	337,400
Chromite Ore	American Chrome Company				243,346	251,323
Iron King	Shattuck Dene Mining Corporation				222,892	298,104
Gray	Tri-State Zinc, Inc.	279,579	287,842	310,103	278,849	250,749
Graham Unit	Eagle-Picher Company				200,000	207,500
Sunshine	Sunshine Mining Company	249,686	250,698	225,883	208,228	206,385
Star <sup>j</sup>	Hecla Mining Company	228,304	216,877	216,471	189,811	199,000
Saline County	Reynolds Mining Corporation			180,181	151,874	162,943
Phosphate	Montana Phosphate Products Company			325,000	294,971	157,576
Illinois	Ozark-Mahoning Company			150,324	179,472	151,597
Birkett Unit	Eagle-Picher Company				121,000	136,000
Panama	American Smelting & Refining Co.	153,718	132,656	76,831 <sup>k</sup>	109,586	128,751
Bowers-Campbell	Tri-State Zinc, Inc.					127,864
Tungsten	Nevada, Massachusetts Company			151,557	178,035	126,743
Galena	American Smelting & Refining Company	0	0	56,489 <sup>l</sup>	87,925	123,129
Edwards	St. Joseph Lead Company Edwards Division				121,788	121,648
Big Buck	Standard Uranium Corporation	0	0	96,538	133,259	92,024
Daisy	Banner Mining Company				76,007	91,174
No. 1	Minerva Oil Company	62,841	48,272	70,651	66,771	87,127
Day Mines	Day Mines, Inc.	142,331	120,355	95,177 <sup>m</sup>	116,039	84,572
Mizers Chest	Banner Mining Company			83,084	84,771	82,984
Victory	Minerva Oil Company			9,746	93,320	62,778
Radios	Hecla Mining Company	0	0	3,506	53,605	62,143
Lukachukai Mountains	Kerr-McGee Oil Industries			40,000	48,000	60,000
Getchell	Getchell Mine, Inc.			136,100	134,220	54,860
Mineral Hill	Banner Mining Company			97,464	107,334	51,868
Emperius Mine	Emperius Mining Company				28,643	50,770
Silver Summit	Hecla Mining Company				50,806	50,304
Lucky Friday	Lucky Friday Silver-Lead Mines Company				44,464	40,780
Silver	Clayton Silver Mines				39,901	39,705
Jamestown	Ozark-Mahoning Company			29,033	32,753	38,378
Morning	American Smelting & Refining Company	96,010	49,468	41,799 <sup>n</sup>	45,946	36,919
Green River	Four Corners Uranium Corporation				26,559	35,373
Austin-Benton	Minerva Oil Company					34,136
New Idria	New Idria Mining and Chemical Company	35,486	43,282	36,236	22,517	33,437
Crystal	Minerva Oil Company				58,770	51,789
Amelia	Tri-State Zinc, Inc.	0	0	0	35,089	31,298
Radium Group	Dulaney Mining Company				25,713	23,937
Linden Unit	Eagle-Picher Company				36,311	22,518
Continental No. 1	Continental Materials Corporation			13,884	18,316	22,319
Cowdrey	Ozark-Mahoning Company			31,291	24,382	18,005
Largo	Four Corners Uranium Corporation				13,402	16,793
Twin Buttes	Banner Mining Company				0	12,284
Crestwood	Bunker Hill Company	0	0	10,681	2,411	11,023
Jack Waite	American Smelting & Refining Company		9,532	6,478 <sup>o</sup>	7,253	10,079
Section 10	Kernica Nuclear Fuels Corporation				9,229	8,556
Uranium Division	Shattuck Dene Mining Corporation				31,387	7,418
Arizona	Eagle-Picher Company				0	5,781
Rattlesnake Incline	Continental Materials Corporation	0	0	4,930	4,025	3,774
Bull Canyon	Four Corners Uranium Corporation					3,682
Haystack Butte	Federal Uranium Corporation				3,226	2,668
Jefferson	Minerva Oil Company					2,485
Oakie	Federal Uranium Corporation	0	0	0	1,421	2,299
Depression No. 6	Continental Materials Corporation				41,273	1,667
Nevada Scheelite	Nevada Scheelite Div. of Kennametal Inc.				2,486	806
Lion Creek	Four Corners Uranium Corporation			971,000	3,803,760	N.A.
White Pine	White Pine Copper Corp.	216,900 <sup>p</sup>	805,356	971,000	361,872	N.A.
Zinc	Tennessee Coal and Iron Division (U.S. Steel)			971,000	336,368	N.A.
Hammie	Tungsten Mining Corporation	206,760	297,879	323,996	282,311	N.A.
Scrub Oaks Mine	Alan Wood Steel Company			283,382	282,311	N.A.

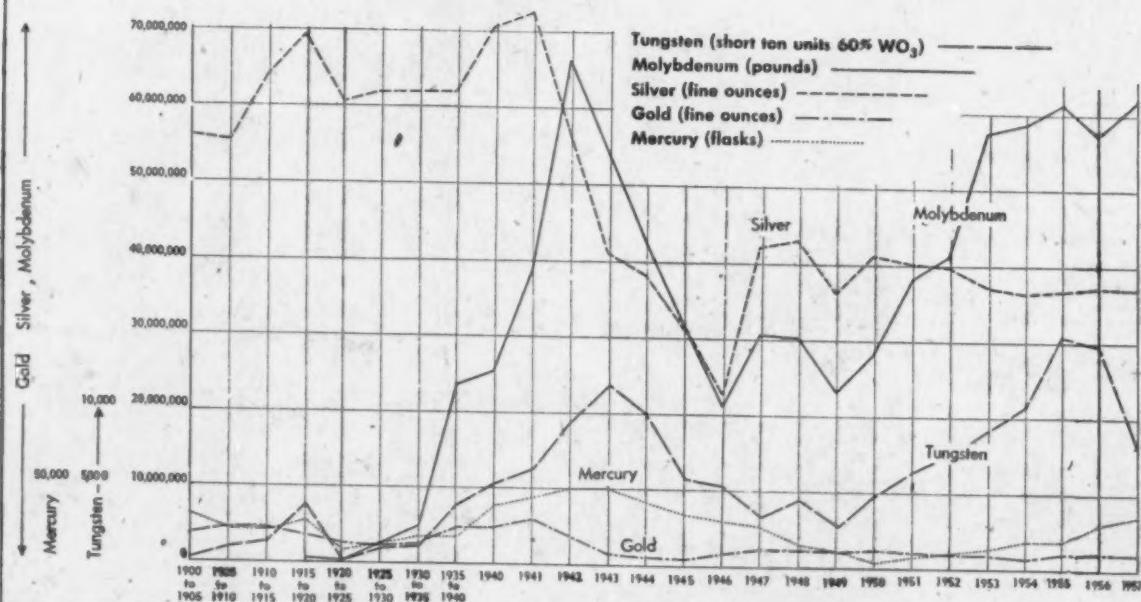
Blackbird  
United Mines  
Bonanza Utah Mines  
Dysart No. 1  
Red ore  
Zinc mines

Calera Mining Company  
United Park City Mines Company  
American Gypsum Company  
Rio De Oro Uranium Mines, Inc.  
Tennessee Coal and Iron Division (U.S. Steel)  
Tennessee Coal and Iron Division (U.S. Steel)

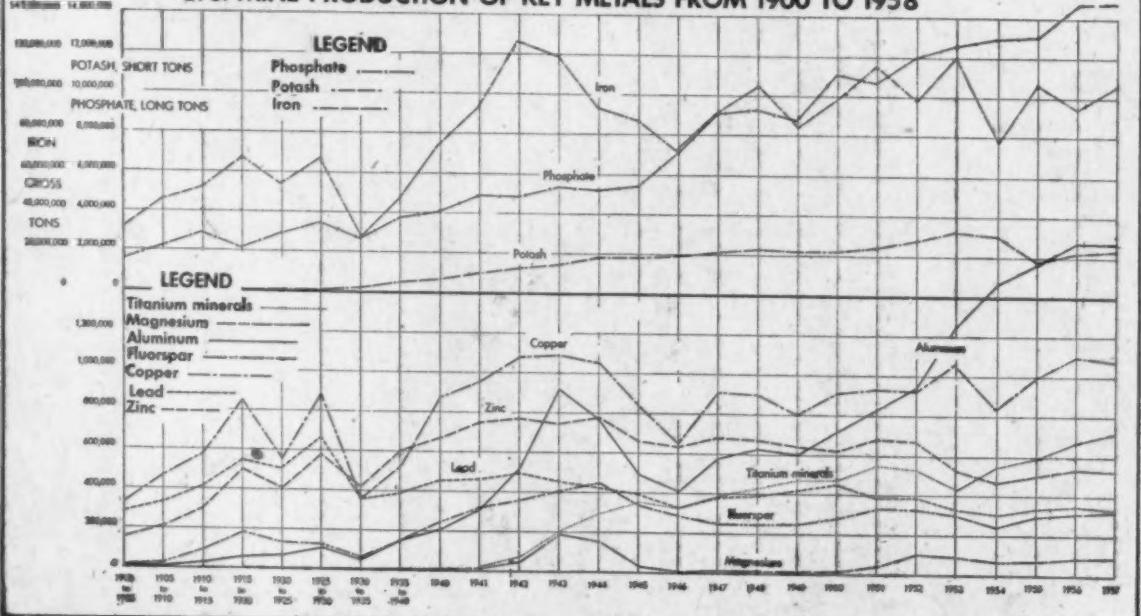
	64,574	137,875	176,977	275,724	N.A.
0	0	19,326	79,364	83,427	N.A.
—	—	—	53,538	78,349	N.A.
0	0	3,394,693	3,328,193	18,391	N.A.
—	—	245,870	388,570	N.A.	N.A.

1. Net tons. 2. Production cut by six weeks strike. 3. Net weight. 4. Production cut by five months strike. 5. Development only. 6. Mine owned by Bunker Hill Company. N.A. Not available.

## U. S. MINE PRODUCTION OF KEY METALS FROM 1900 TO 1958



## U. S. MINE PRODUCTION OF KEY METALS FROM 1900 TO 1958



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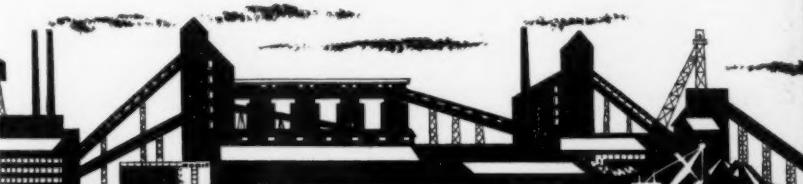
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## equipment for the

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## MINERALS

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# VIBRATING SCREENS . . . a complete line

## SELECTION GUIDE for metallic minerals industry

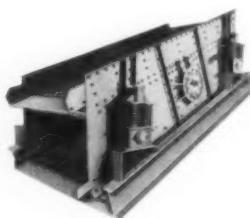
Vibrating Screen Applications	Maximum Feed Size (inches)	Aperture Range (inches)	Screen	Common Sizes (feet)
Scalping—ahead of Jaw Crushers . . .	36	3 to 10	ROM Model XXH	5 x 10 to 6 x 14
Scalping—Following primary crushers . . .	20	1 to 10	Model XH	4 x 5 to 6 x 16
Scalping—Following secondary crushers or hammermills . . .	6	1/4 to 5	Model SH	3 x 6 to 6 x 16
Dry Sizing . . .	6	40 mesh to 5	Model SH	3 x 6 to 6 x 16
Dry Sizing . . .	5	1/8 to 2 1/2	Low-Head	3 x 6 to 8 x 20
Dry Sizing . . .	4	40 mesh to 3	Model S	3 x 6 to 4 x 10
Dry Sizing . . .	4	40 mesh to 1 1/2	Model AVS	3 x 6 to 4 x 10
Wet Sizing and Washing . . .	6	40 mesh to 5	Model SH	3 x 6 to 6 x 16
Wet Sizing, Washing and Dewatering . . .	5	1/4 mm to 2 1/2	Low-Head	3 x 6 to 8 x 20
Wet Sizing . . .	4	40 mesh to 3	Model S	3 x 6 to 4 x 10
Wet Sizing . . .	4	40 mesh to 1 1/2	Model AVS	3 x 6 to 4 x 10
Media Recovery and Washing . . .	8	1/4 mm to 2 mm	Low-Head	3 x 12 to 8 x 20
Thickening, Dewatering and Filtering . . .	3/8	1/8 mm to 1 mm	Low-Head	3 x 12 to 8 x 20

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For the heaviest scalping problems

Model XXH ROM screens are of heavy steel construction with balanced, two-bearing cartridge-type mechanism. May be obtained with plate or stepped grizzly bar decks. Max. opening — 10 to 11½ inches . . . 1 or 2 decks. Send for Bulletin 07B8368.



### Model XH Extra Heavy Duty inclined screens

For wet or dry scalping and coarse sizing

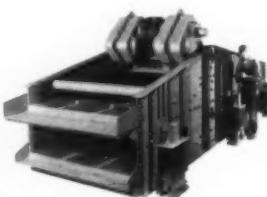
Model XH *Ripl-Flo* screens have balanced two-bearing mechanisms and may be obtained with perforated plate, rod or stepped grizzly bar decks. Max. opening — 10 inches . . . 1, 2 or 3 decks. Send for Bulletins 07B6151 and 07B7868.



### Low-Head Heavy Duty horizontal screens

For moderate to heavy sizing, coarse to fine, wet or dry, thickening dewatering, media recovery and rinsing.

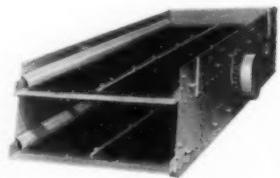
Low-Head screen operation saves headroom and space. Conveniently mounted mechanism imparts a straight line motion to screen. Max. opening — 2 1/2 inches . . . 1, 2 or 3 decks. Send for Bulletins 07B6330 and 07B7868.



### Model SH Standard Heavy Duty inclined screens

For moderate to heavy sizing, coarse to fine, wet or dry, light scalping and rinsing

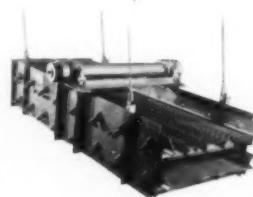
Model SH *Ripl-Flo* screens have balanced, two-bearing mechanism and are designed for a wide range of applications. Max. opening — 5 inches . . . 1, 2 or 3 decks. Send for Bulletins 07B6151 and 07B7868.



### Model AVS Standard Duty inclined screens

For fine sizing, wet or dry

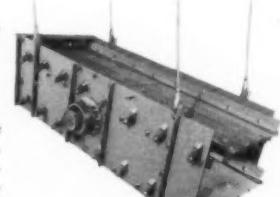
Model AVS Aero-Vibe screens have two-bearing mechanism located above the body. Gives top screening efficiency at lowest possible cost. Max. opening — 1 1/2 inches . . . 1, 2 or 3 decks. Send for Bulletin 07B6099.



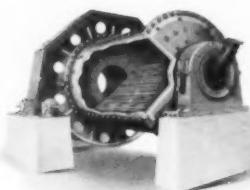
### Model S Standard Duty inclined screens

For moderate, wet or dry sizing

Model S *Ripl-Flo* screens are sturdy, low cost screens . . . have two-bearing mechanism. Max. opening — 3 inches . . . 1, 2 or 3 decks. Send for new Bulletin 07B8229.



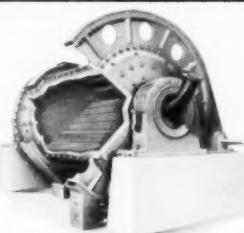
# GRINDING MILLS... all types



## Overflow Rod Mill

Sizes 3 to 11½ ft diameters, 6 to 16 ft lengths. Rod mill product can be varied from 6 to 35 mesh, with a minimum amount of fines. Because a rod mill can reduce a one inch slot size feed, it has supplanted the last stage of crushing in many plants. The screening action of the rods within the mill produces an ideal ball mill feed, free from tramp oversize, without the use of close circuiting screens.

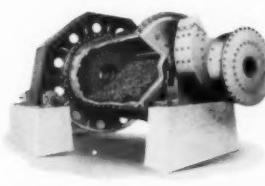
Bulletin 07B6718.



## Peripheral Discharge Rod Mill

Sizes 3 to 11½ ft diameters, 6 to 16 ft lengths. The peripheral discharge rod mill was developed for those dry grinding circuits where close control is required for either the product top size or the fines. In addition to these dry grinding applications, either the end peripheral or the center peripheral discharge rod mill may be used in wet circuits where specific product requirements must be met.

Bulletin 07B6718.



## Ball Mills

Sizes 3 to 13 ft diameters, 3 to 17 ft lengths. For producing a finely ground product of 28 to 325 mesh from a feed size of about ¼ inch. Ball mills are unsurpassed for the fine grinding of moderately to extremely abrasives materials.

Overflow type ball mills are used for fine wet grinding in closed circuit with a classifier. Diaphragm type ball mills are universally used for fine or coarse, wet or dry grinding in closed circuit with a classifier, screen or air separator.

Bulletin 07B6718.

## PYRO-PROCESSING EQUIPMENT

### ROTARY KILNS . . .

For sintering, nodulizing, pelletizing, agglomerating, calcining

### AIR QUENCHING GRATE COOLER

### CONVERTERS

### BALLING DRUMS

### ROTARY COOLERS, DRYERS

### HOLDING FURNACES

## WASHING EQUIPMENT

### CONTINUOUS CONTACT COLUMN

### BLADE MILLS

### LOG WASHERS

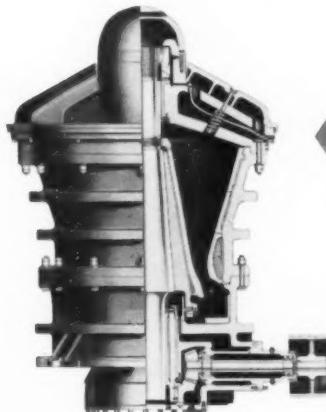
## MATERIALS HANDLING EQUIPMENT

### CAR SHAKERS

### TRACTORS AND GRADERS

### MOTOR WAGONS

# CRUSHERS FOR EVERY MINING JOB



## Superior Gyratory Crushers

For high capacity primary or secondary crushing

Twelve sizes . . . 16-50 to 60-109 (60 inch feed opening, 109 inch diameter cone at crushing point). Capacity 170 to 3500 tph. Available with Hydroset mechanism or spider suspension.

Bulletin 07B7870.

## Hydrocone Gyratory Crusher

For high capacity secondary or tertiary crushing

Twenty-one sizes . . . 122 to 1784 (17 inch feed opening, 84 inch diameter cone at crushing point). Capacity 7 to 1050 tph. Equipped with Hydroset mechanism. Bulletin 07B7145.

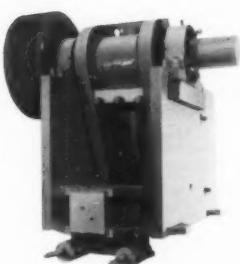


## A-1 Jaw Crushers

For primary crushing of tough, abrasive material in blocky feed sizes

Four sizes . . . 36x25 to 60x48 inch feed openings. Capacity, 200 to 660 tph.

Bulletin 07B6369.



## Model ST Jaw Crusher

For crushing moderately hard material with minimum fines

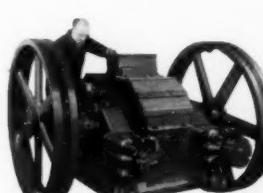
Five sizes . . . 18x30 to 42x54 inch feed openings. Capacity, 75 to 650 tph. Bul. 07B8595.

## Roll Crushers

For fine crushing of hard material with minimum fines

Double-roll crushers are driven by large flywheel sheaves. Roll diameters from 9 to 78 inches.

Bulletin 07B6180.



## Blake Jaw Crushers

For moderate capacity crushing of hard materials

Five sizes . . . 10x7 to 30x18 inch feed openings. Capacity, 6 to 90 tph. Bulletin 07B7090.

## Fine Reduction Jaw Crusher

For crushing 7 inch and smaller feed to 50% passing ¼ inch in one operation

Two sizes . . . 18x9 and 24x10 inch feed openings.

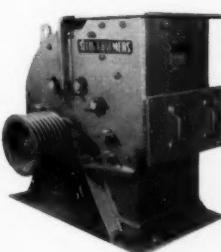
Bulletin 07B6425.

## Pulverator Hammermill

For pulverating non-abrasive materials

Hammers reduce material by multi-impact . . . large ratio of reduction. Handles up to 4 inch feed. Five sizes . . . capacity 2½ to 125 tph.

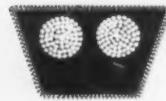
Send for Bulletin 07B6265.



# A DRIVE FOR EVERY MACHINE

**Texrope**—greatest name in V-belt power transmission—is the registered trademark of Allis-Chalmers, originator and pioneer of multiple V-belt drives.

Ask for Bulletin 20C6051, "Handy Guide to Selection of Texrope Drive Equipment"; it tells the complete Texrope Drive story . . . V-belts . . . sheaves . . . and how to figure a Texrope drive.



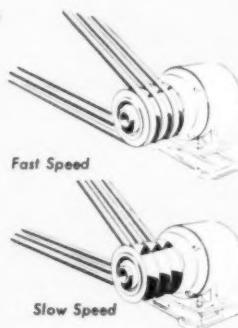
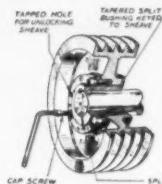
Grommet Belt



Wide Range Belt

## Texrope V-belts

Famous patented grommet construction provides longer life than ordinary V-belts. Made with straight sides for greater grip. Types for all operating conditions: heat-resisting; oil-resisting; static-resisting and special High Capacity. Also available: Texrope wide range V-belts for use with wide range Vari-Pitch sheaves and Vari-Pitch Speed Changers.



## Magic-Grip Sheaves

The Magic-Grip cast iron sheave provides fast, easy mounting and demounting. Construction is simple, foolproof. Sheave automatically adjusts itself to slightly oversize or undersize shaft. Positive clamp fit on shaft means no weaving—no vibration. There is no back lash—no extra play. Sheave can be mounted closer to motor or machine—reducing strain and stress. Result: bearing pressure eased—bearing life increased.

Stock sizes for drives up to 200 hp. Larger sizes available on order.

## Vari-Pitch Sheaves and Speed Changers

VARI-PITCH SHEAVES are available in two types: Standard Range for A, B, C, D or E belts—capacities from 1 to 300 hp—speed variations up to 40%. Wide Range for Q and R belts—capacities from 1½ to 40 hp—speed variations up to 100%. Both types designed with stationary or motion control features—Stationary Control for infrequent changes when sheave is stopped; Motion Control for repeated speed changes while sheave is in motion.

Vari-Pitch Speed Changers furnish 3½ to 1 speed ratio in one compact, enclosed unit. Adjustable while in motion. Combines two wide range, worm gear-adjusted sheaves. Manual or pushbutton control.

## MOTORS FOR EVERY DRIVE

Allis-Chalmers builds a complete line of polyphase squirrel cage, wound rotor, synchronous, and direct current motors with electrical and mechanical modifications to meet any application. Ask for Bulletin 51C6052, "Handy Guide for Quick Selection of Electric Motors"; it furnishes you with enough facts on Allis-Chalmers motors to enable you to select the type which meets your required electrical and mechanical specifications. The next time you need an electric motor, contact your nearby Allis-Chalmers representative.



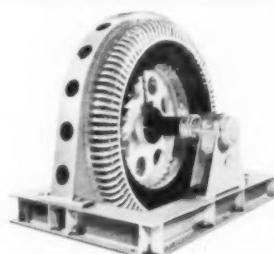
**DRIP-PROOF** — New NEMA rated squirrel cage motors are available in standard ratings starting at ½ hp. Their better protection against foreign matter helps keep maintenance costs low. Bulletin 51B6210.



**TOTALLY ENCLOSED FAN-COOLED** — Ideal for dirty, dusty, oily, humid, corrosive, and outdoor locations. Rapidly moving air from the cooling fan keeps most dirt from settling on motor. Easily cleaned. 51B7725.



**LARGE CAGE MOTORS** — Built in sizes to meet all industrial, power plant, and special application requirements. Construction shown is available from 60 hp at 300 rpm to 2000 hp at 1800 rpm. 05B7542.



**SYNCHRONOUS** — Built in ratings from 40 hp up for a wide variety of speeds, including 3600 rpm motors in the larger sizes. Have high efficiency. Improve plant power factor for reduced power costs. 05R8183.



**WOUND-ROTOR MOTORS** — For constant speed duty requiring frequent reversing or starting under heavy load. Adjustable-varying speed loads. High starting torque applications, such as crushers, kilns, blowers. 51B8195.



**WEATHER-PROTECTED** — Design simplicity and the ability to operate under the most severe weather conditions are combined in this weather protected motor. Sizes from 250 hp up. Bulletin 51B8606.

## CONTROL FOR EVERY MOTOR

Allis-Chalmers makes a line of starters to meet practically all motor control needs. Count on this wide range of starters, backed by industry-wide application engineering experience, for the answer to your control needs. Ask for Bulletin 14R7988.



## Power Distribution

Allis-Chalmers also supplies a complete line of power distribution equipment to mining plants. This includes power, distribution, and instrument transformers; indoor and outdoor switchgear and unit substations; circuit breakers; power rectifiers.

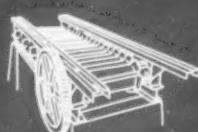
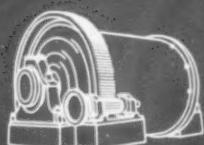
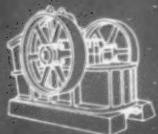
## Tractor Equipment

Allis-Chalmers has geared its development progress to the earth moving and material handling needs of the mining industry and is supplying crawler tractors, tractor shovels, pull scrapers, motor scrapers, motor wagons, motor graders, and power units.

**ALLIS-CHALMERS**

969 South 70th Street, Milwaukee 1, Wisconsin

LITHO IN USA C



*Traylor*

**Traylor** -MADE



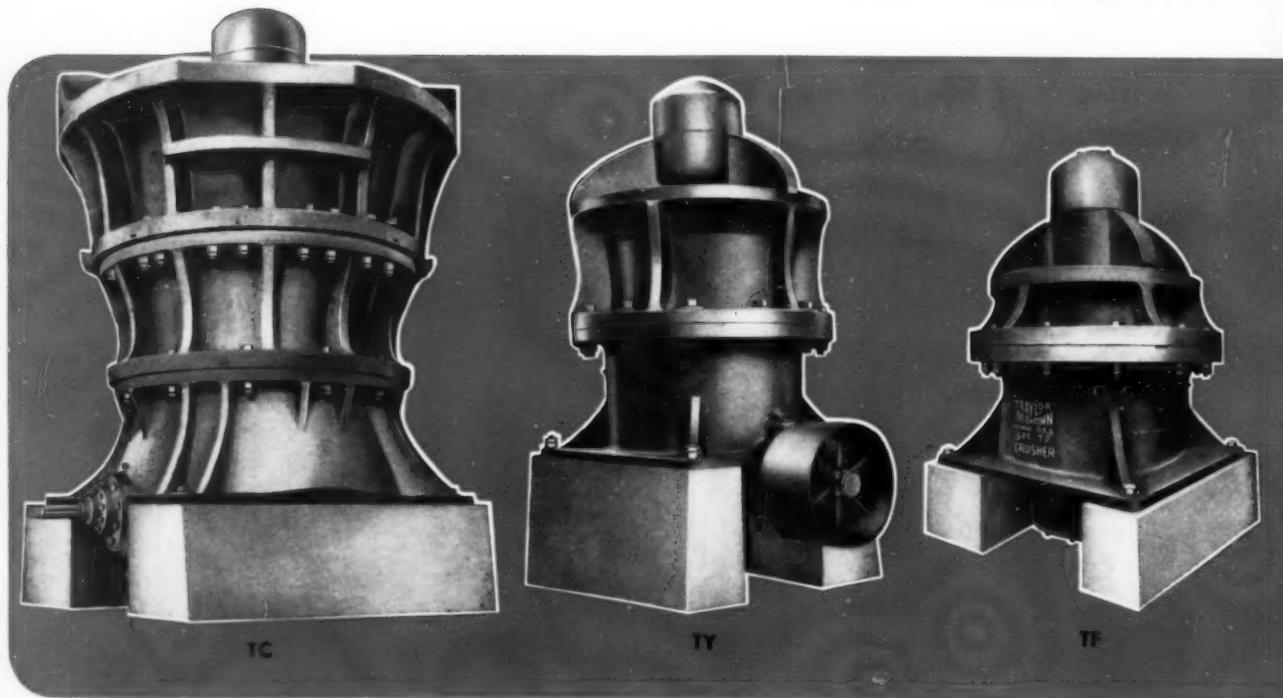
**TRAYLOR . . . a name known to the mining industry throughout the world for producing machinery designed to deliver maximum production at the least possible operating cost year in and year out. For over half a century Traylor machines have been in daily use by hundreds of operators, demonstrating time and again Traylor engineers build the very best in mining machinery.**

**TRAYLOR ENGINEERING & MANUFACTURING COMPANY  
ALLENTOWN, PENNA., U.S.A.**



# CRUSHING

offers the operating  
**TRAYLOR CURVED**  
An original



## PRIMARY Crushers

Traylor Bulldog Gyratory Crusher Type TC is the most advanced design of large capacity gyratory crushers. Built in six sizes with capacities ranging from 245 tons of a 2" product to 4100 tons of an 11" product, these gyratories feature Traylor original non-choking, self-tightening bell head and curved concaves. Massive construction provides for shock absorption and at the same time all parts are readily accessible for maintenance. The Traylor patented dust seal provides a practical and efficient device for excluding dirt from the lubrication chamber. These are just a few of the features of the Traylor TC Gyratory Crusher — features you want in your crushing machinery.

## SECONDARY Crushers

Traylor makes two types of reduction crushers: the TY in six sizes from 1'-3" to 5'-6" with feed openings from 3" to 22", and the TF Fine Reduction Crusher for operators whose needs demand economic production of 5/16" to 1-1/4" material in large capacity. Both of these crushers require less head room due to compact, simplified design. Traylor original curved concaves and self-tightening bell head are used in the TY and TF Crushers. The design, construction and operational features embodied in these reduction crushers are the direct result of Traylor's long and diversified experience and leadership in the ore and stone crushing field.



NEW YORK: 3410 Empire State Bldg.

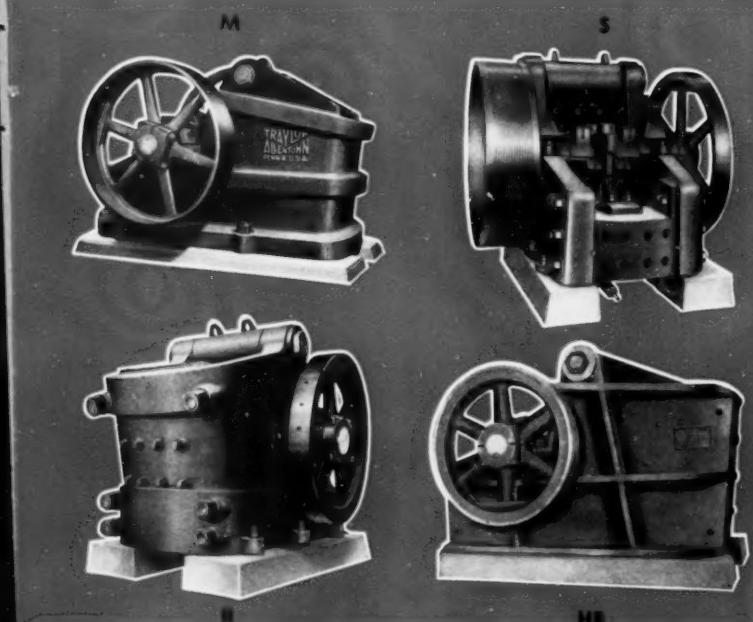
SAN FRANCISCO: 405 Market St., 15 New Montgomery St.

CHICAGO: 1212 Fisher Bldg. 342 S. Dearborn St.

FOREIGN SALES AGENCIES: Lima, Rio de Janeiro, Buenos Aires, Santiago, Antofagasta, Oruro,

# MACHINERY

efficiency and economy of  
**CRUSHING SURFACES . . .**  
Traylor development



Curved crushing surfaces, an original Traylor development, are shaped so that the faces are opposed to the direction of motion. Power requirements are reduced, even at finer settings, because more of the power applied is used as a direct crushing force.

By increasing the capacity of each succeeding feeding zone in the crushing chamber, choking and packing are practically eliminated.

## JAW Crushers

As a result of Traylor's many years of experience in building crushers, they have developed one of the most advanced groups of jaw crushers made. Traylor Jaw Crushers are built in five types with 18 different size feed openings. Capacities range from four tons of 7/8" material to 1,000 tons of 11" material per hour. The five types of Traylor Jaw Crushers are H, HB, M, R and S. All of these five machines are precision built to perform their rugged task efficiently.

Traylor's patented swing jaw suspension and originally developed curved jaw plates account for greater capacity at finer settings and longer life of jaw plates. Traylor's curved jaw plates will outwear ordinary plates as much as 3 to 1. All frames are reinforced at critical points to provide strength without excessive weight. For more information on Traylor-Made Jaw Crushers, state your requirements and a bulletin will be forwarded to you immediately.

AUSTRALIAN MANUFACTURER: Jacques Bros. Richmond 8-1, Victoria, Australia

CANADIAN MANUFACTURER: Canadian Victor, Ltd. P.O. Box 550, Place D'Armes Station, Montreal, P.Q., Canada

La Paz, Montevideo, S. A.; Madrid, Spain; Oslo, Norway; San Juan, Puerto Rico; Manila, P. I.; London, England.

# Other fine Traylor-Made Products in use by the mining industries throughout the world.



**TRAYLOR CRUSHING ROLLS** are built in three types—the Four Tension Rod type capable of delivering large capacities and standing up under the most severe, continuous service. Type AA and A Rolls are designed for lighter service. The range in size of the three rolls is from 18" dia. x 10" face to 78" dia. x 24" face with tension springs to develop pressures up to 30,000 lbs. per lineal inch of roll face. Write for bulletin # 6637.

**TRAYLOR CASTING MACHINES** are built in two types: Circular and Straight Line. The Circular Casting Machine is heavily proportioned, driven by two motors through separate gear trains but with a single control and is designed to run in either direction. The track is conical, and the turn-table supporting the mold platform runs on flanged conical rollers. Traylor Casting Machines have been built in sizes up to 40'-0" and can be designed for anode, cathode, wire bar or pigs. Write for additional information.

**TRAYLOR MANUFACTURES** four types of feeders specially designed for application in the several steps of crushing, grinding, drying or calcining. These four types are the Sheridan Grizzly Feeder, the Apron or Pan Feeder, the Table Feeder and the Slurry Feeder. Grizzly Feeders are made in sizes from 3'-0" x 6'-0" to 10'-0" x 20'-0" and Apron Feeders in widths of 30" to 84" in any length required. All Traylor Feeders are adapted to the size and kind of material to be handled and are easily adjusted to vary their rate of delivery of material. For more on Traylor Feeders, write for bulletin # 2114.

**TRAYLOR ENGINEERS** have pioneered and developed some of the outstanding features used in kiln manufacture. One of the improvements made by Traylor engineers is the design and perfection of the easy aligning, single roller supports used on Traylor Rotary Kilns, Coolers, Dryers and Slakers. The "full-floating" type of tire is another Traylor Kiln advancement. For details on Traylor Kilns, Coolers, Dryers and Slakers, write for bulletin # 1115.



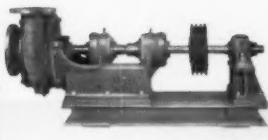
**TRAYLOR ENGINEERING & MFG. CO., 1014 MILL ST., ALLENTOWN, PA.**

Sales Offices: New York — Chicago — San Francisco

Canadian Mfr.: Canadian Vickers, Ltd., Montreal, P. Q.

# Mine and General Purpose Pumps

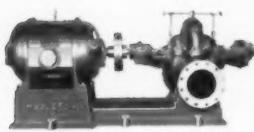
Type "CA"



100-1000 G. P. M.      50-200 FT. HEAD      100 HP

A sturdy single-suction volute pump for handling small capacities at high efficiency. All ball-bearing construction. Renewable suction and discharge heads. Built for either direct drive thru flexible coupling, taper bored for easy removal, or for V-belt drive. Pulley overhanging or on extended shaft with outboard bearing, mounted on cast iron or structural steel bed-plate. Pump end furnished in cast iron, bronze or stainless steel.

Type "DS"



200-15,000 G. P. M.      20-400 FT. HEAD      1000 HP

These double-suction pumps are heavily built for severe service. A sleeve type main bearing and a ball thrust bearing are standard construction but all ball-bearing construction can be furnished. Shaft is protected by heavy cast bronze or chrome sleeves. Pump-half coupling is taper bored. All sizes have renewable casing and impeller wearing rings. Split glands. Pump end furnished in cast iron, bronze or stainless steel.

Type "DS-2"



1000-10,000 G. P. M.      300-700 FT. HEAD      2000 HP

In this two-stage double-suction pump, the water flows thru a Y-pipe into two single-suction impellers which discharge into a centrally located double-suction impeller. Both stuffing boxes are therefore under inlet pressure, an important feature, since high-pressure stuffing boxes can be very troublesome, especially when acidulous water is pumped. The double-suction design permits higher speed for high suction lifts and provides perfect hydraulic balance.

Type "DSS"



500-4500 G. P. M.      200-500 FT. HEAD      600 HP

The "Sinker" was developed to de-water flooded mine workings. It is a powerful, reliable unit which operates from zero to maximum head without noise or vibration. An inflexible steel frame keeps pump and motor in alignment. The unit can be arranged for running on a track or for vertical mounting on a mine cage or for suspension from a hoisting rope. Built-in strainer straightens out turbulent flow and insures smooth operation.

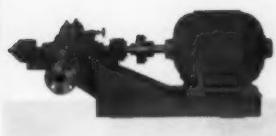
Type "MS"



150-7000 G. P. M.      100-1500 FT. HEAD      1250 HP

Originally developed by "HAZLETON" engineers, multi-stage opposed impeller volute pumps have become standard for high head pumping. The Type "MS" pumps consist of a series of two-stage casings with impellers arranged "back to back" and assembled as two-stage, four-stage or six-stage units. The individual two stage casings can readily be cast, are very strong and the replacement cost is low. Ruggedly designed for severe mine service. Complete lines available in 1200, 1800 and 3600 R.P.M. units. Can be furnished in cast iron, ductile iron, bronze or all stainless steel.

Type "MSH"



100-900 G. P. M.      200-600 FT. HEAD      150 HP

A new compact high-speed (3000 to 3600 R.P.M.) two stage opposed impeller volute pump for low capacity and high head service. The high-pressure stuffing box, which is at first stage pressure, faces the outboard bearing and is readily accessible. Mounted on an "inflexible" steel frame. These units are excellent for small mines. They are available in cast iron, bronze, or stainless steel.

# Vertical Mine & Solids Handling Pumps

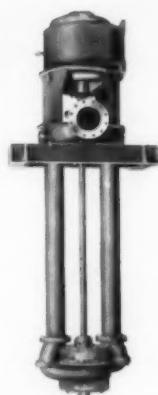


Type "VS"

**TYPE "VS"\*\* 100-6000 G. P. M. 25-450 FT. HEAD 800 HP**

Embodying the famous Hazleton "Twin-Volute"\*\*\*, this top-suction vertical pump is excellently adapted for handling clear water as well as slush and solids. Clear water pumps are fitted with a floating Tee-shaped impeller seal ring. Slush-pumps have an adjustable seal-ring and a shaft-enclosing tube for feeding clean water to the pump-bearing.

The "Twin-Volute"\*\*\* provides balanced side thrust and assures long bearing life. The pump has no stuffing box at either pump end or discharge head. Discharge head contains thrust bearings so standard solid-shaft motor can be used. Intermediate bearings are available to extend length to 50' or more. Intermediate bearings can be either water or oil lubricated.



Type "VD"

**TYPE "VN"\*\* 50-2500 G. P. M. 25-150 FT. HEAD 150 HP**

The complete line of "VN" pumps incorporates all of the fine features of the "VS" pumps and in addition provides a cast ball-bearing housing which rigidly supports the shaft so that cantilever construction can be used. Thus there is no bearing under water. Excellently suited for medium recirculation and froth handling since there is no stuffing box and no bearing lubricating water. Cantilever shaft design limits the length of these units. V-belt drives are available. Can be furnished in any machineable alloy. Special 3600 R. P. M. units available for shaft sinking work.



Type "VN"

**TYPE "VMS"\*\* 600-5000 G. P. M. 300-800 FT. HEAD 1250 HP**

The exclusive "Twin-Volute"\*\*\* design has been incorporated with another HAZLETON first—opposed impeller design to provide a unique 2-stage vertical pump. It has both lateral and vertical hydraulic balance. Floating "Tee" rings and a self-contained thrust bearing eliminate critical adjustment worries. Trouble free operation is assured by absence of a stuffing box. Intermediate bearings, suitable for water or oil lubrication, are available. Ideal for "between level" pumping underground, or for use on a barge in deep open pit mines.



Type "P"

**TYPE "VD"\*\* 2000-10,000 G. P. M. 200-450 FT. HEAD 1250 HP**

These pumps are similar to the "VS" except that double suction design is utilized for high capacities. Available in both fresh water and solids handling designs. Solids handling units have adjustable rings on both sides of the impeller. These units are ideal for recirculating water service where small amounts of abrasive solids are carried by the water. Available up to 100 ft. in length. No stuffing box. Fully accessible line and pump bearings.



Type "VMS"

**TYPE "P" 25-100 G. P. M. 10-50 FT. HEAD 2 HP**

An exceptionally well built all bronze and stainless steel (or all stainless) pump for clean-up service in small mills. Available in three sizes,  $\frac{3}{4}$ ,  $1\frac{1}{2}$  and 2 HP. Handles any solids which pass through the  $\frac{1}{2}$ -in. strainer holes. Lubricating water externally supplied. Intermediate bearings can be provided to extend length to as much as 20 ft.

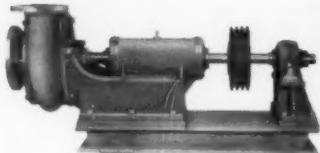


Type "H" & "PE"

## TYPE "H" and "PE" PORTABLE PUMPS

The pump end of these units is identical to that of the Type "P" pumps except that the bearings are self-lubricating. Designed for portable service, they are available with totally enclosed  $\frac{3}{4}$ ,  $1\frac{1}{2}$  and 2 HP motors in single and 3 phase A.C., and for direct current. Explosion proof, U. S. Bureau of Mines Permissible units are available in  $\frac{3}{4}$  HP 230-250 V.D.C. and 550 V.D.C. The latter units have built-in starting switches with overload protection. (See cut).

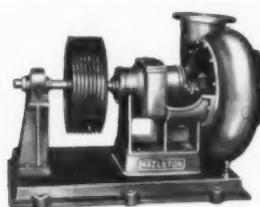
# Horizontal Solids Handling Pumps



TYPE "HR" 50-1000 G. P. M. 20-100 FT. HEAD 40 HP

A heavily constructed open-impeller pump for general service. Casing and casing head are bolted to a substantial yoke cast integrally with the bearing housing. Two double-row ball-bearings support the shaft. The part of the shaft passing thru the stuffing box is protected by a heavy cast bronze or chrome sleeve. Motor-driven pumps have flexible couplings. Pump half is taper bored to permit easy removal. Belt driven pumps furnished with extended shaft and out-board bearing. Bed-plates are either of cast-iron or structural steel.

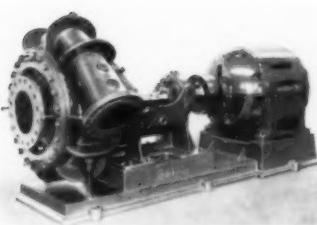
The pump can be furnished with a special bearing and shaft so constructed that the shaft with impeller can be adjusted to take up impeller wear.



TYPE "CB" 100-10,000 G. P. M. 20-150 FT. HEAD 150 HP

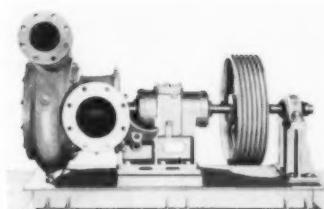
A highly efficient closed impeller pump, ruggedly built for handling low and medium percentages of solids.

Suction and discharge heads are removable and the casing can be used for R. H. or L. H. assembly. Casing is bolted to a heavy yoke. The weight of casing and piping is carried by two heavy supporting-bolts, screwed into the bed-plate. Shaft with impeller can be conveniently adjusted for wear of the impeller ring. This insures longer life of casing and impeller rings. Delivery of water remains at original rate until impeller is worn out. Pumps are built for direct motor drive or for belt drive on extended shaft, supported by out-board bearing. Bed-plates are of cast-iron or structural steel.



TYPE "CT" 200-6000 G. P. M. 20-150 FT. HEAD 350 HP

A highly efficient heavily built pump for severe solids handling service. Removable suction and discharge casing-heads are protected by wearing plates held in place by T-head bolts. Weight of casing and piping is carried by two heavy supporting-bolts. The yoke, carrying the casing, is mounted on a substantial base-plate. The yoke and complete bearing assembly including impeller, outboard bearing and sheave, can be withdrawn as a unit without disturbing suction or discharge piping. All internal parts can also be taken out by removing suction piping and casing head. The shaft can be adjusted for impeller wear without changing position of sheave. Glands are split. Pumps can be furnished for V-belt or direct drive. All Ni-Hard or Chrome iron wetted parts.



TYPE "TS" 50-3000 G. P. M. 20-150 FT. HEAD 150 HP

The construction of these pumps is similar to the Type "CB" pumps but the position of the impeller is reversed and the water enters from the stuffing box side. The stuffing box is therefore under inlet pressure. The impeller can be conveniently inspected by merely removing the casing head. Ring clearance is easily adjusted to compensate for wear. The exclusive "Kleerseal" \* stuffing box, which seals effectively at all times without diluting the pumped mixture, makes this the ideal medium recirculating pump for heavy density systems. Available in cast iron, chrome iron fitted construction; all chrome iron; or in sizes 6" and larger, with Ni-Hard casing, wearing plate, casing ring and impeller.



TYPE "VSC" 50-3000 G. P. M. 15-40 FT. HEAD 50 HP

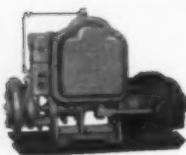
This "Classifier" pump is an excellent example of the specialized equipment designed and built by "HAZLETON."

The pump is installed in a Hydrotator classifier. The liquid is drawn into a top-suction impeller and is discharged into a series of rotating agitator arms attached to the discharge pipe. Pump and agitator mechanism are suspended from a spherical bearing which permits the whole assembly to sway slightly and to rotate. The weight of the impeller and the hydraulic thrust are carried by a double row ball bearing. The rubber bearing supporting the pump shaft is lubricated by clear water, fed into a well, surrounding the bearing and sucked thru the bearing grooves into the impeller. The pump has no stuffing box. The impeller seal ring is adjustable and the casing has a renewable wearing plate.

The pump is also used, in modified form, in the "Hydrotator" froth flotation system. These pumps are built in four sizes with 5, 10, 15 and 25 HP motors with bronze or chrome iron casing and impeller.

# Automatic Pumping

Auto-Pump



70 - 650 G. P. M.      30 - 180 FT. HEAD

A fully automatic and highly efficient pumping installation in one unit, built for mine service. Starts and stops by means of electrodes, float control or time-clock. Priming by means of a priming tank, which becomes inoperative when pump is primed and therefore does not interfere with the efficient operation of the pump. Motor stops and alarm is sounded if pump cannot be primed or if it loses the water.

Suction-Line Primer



50 - 1500 G. P. M.      300-400 FT. MAXIMUM HEAD

Embodying the principle of the Auto-Pump, the Suction Line Primer provides a convenient and inexpensive means of converting existing installations to automatic control. In conjunction with a "Hazleton" Control Panel the system affords automatic priming, starting, stopping and complete protection for single-stage or multi-stage pumps. The primer does not affect the operation, since the friction loss is negligible.

Control Panels



## AUTOMATIC PUMP CONTROL

"HAZLETON" Control Systems provide fool-proof automatic operation for centrifugal pumps of any make and size.

The expertly built panels contain all necessary control relays, mounted on an asbestos board. The panel is enclosed in a steel cabinet. A plainly marked row of terminals is provided on the board to which all connections to the external devices can readily be made by any electrician. Radio or carrier-current as well as wired telemetering type controls are available.

Signal and Alarm Panels



## LOCAL AND REMOTE SIGNALING

"HAZLETON" Signal and Alarm panels provide the operator with a complete picture of the sump level conditions, whether pumps are operating, or have failed for some reason. A horn provides an audible signal. An alarm silencer button quiets the horn but maintains a red signal light until fault is cleared. Available for single or multiple pump installations. Unit shown is for three pumps.

Priming Pumps



10 - 15 - 25 - 50 - 100 CU. FT. PER MINUTE FREE AIR

These dry vacuum pumps are of the piston type and built for priming service only. The cylinders are air-cooled and are not damaged by slugs of water which may be drawn into the pump during priming. All internal moving parts are splash lubricated. The 10 Cu. Ft. pump has one cylinder, all other sizes have two opposed cylinders. The 100 Cu. Ft. machine is a combination of two 50 Cu. Ft. pumps.

Check-Valves  
(Mine Type)



## SIZES 4" TO 24" STD. AND EX. HVY. CONSTRUCTION

The internal parts of this valve, which is designed for mine service, can be lifted out of the housing as a unit. The leather-faced flap swings freely around a heavy bronze shaft. Liberal water passages result in low friction loss. All sizes can be furnished with a switch, operated by the flap, for pump protection and with by-pass piping and valve. The valves can be furnished in cast iron, bronze or stainless steel.

## SIZES 4" TO 18"

In this simple, low-loss strainer the incoming water flows from the outside thru the perforations to the inside of the strainer basket. Solids and debris settle at the bottom of the housing or become wedged in the strainer basket and can readily be removed. Baskets are of cast metal with rectangular holes or of rolled plate with round perforations. Body and basket can be had in cast iron, bronze or stainless steel.

Strainers



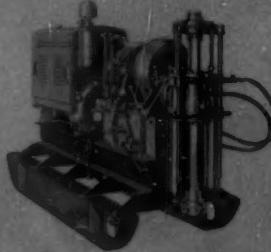
PROMPT SERVICE...

# MODERN DEPENDABLE

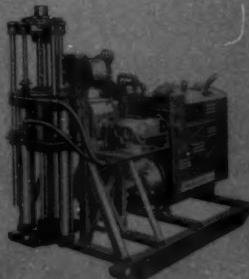
## HI-SPEED DRILLING MACHINES



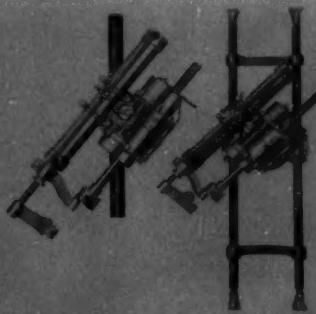
Sprague & Henwood Model 40-CL Gasoline Engine Driven Core Drilling Machine, Low mount type, with double hydraulic swivelhead, oil operated with built-in circulating system. Bulletin # 185-2.



Sprague & Henwood Model 142 Diesel Engine Driven Core Drilling Machine, with built-in oil circulating system and hydraulic swivelhead. Bulletin # 160.



Sprague & Henwood Model 30 Water-Cooled Gasoline Engine Driven Core Drilling Machine with a double hydraulic swivelhead. Built-in water pump (optional). Bulletin # 350.



Model 325 and Model 550 Air operated machines for diamond core drilling underground. Driven by radial piston-type air motors, both of these modern machines have ample capacity for fast steady operation.

NOTE: All models of core drills except underground machines can be furnished with gasoline, diesel, electric, or air power units.

## ACCESSORY EQUIPMENT

Sprague & Henwood's complete line of core drilling accessory equipment is manufactured from the highest quality material to insure long life and dependable service.

Many items are stocked for prompt shipment to you.

All items of accessory equipment are illustrated and described in the complete and up-to-date Bulletin # 400. This bulletin was prepared with the customer as the first and foremost consideration. If you don't have a copy of Bulletin # 400—write for your free copy today.

## CONTRACT DIAMOND DRILLING

For over 75 years Sprague & Henwood has been the leader in the contract diamond drilling field. In that time, crews have completed thousands of contracts successfully, all over the world, in every conceivable condition.

For the best in exploratory core drilling (surface or underground), blast hole drilling, directional drilling, foundation test drilling, grout hole drilling, and pressure grouting—be sure to call Sprague & Henwood. Estimates and suggestions given without charge.

# SPRAGUE & HENWOOD, Inc. SCRANTON 2, PA.

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# "ORIENTED" DIAMOND BITS

## LOWER COST-PER-FOOT

Sprague & Henwood, in close co-operation with the United States Bureau of Mines, initiated the practice of "Orienting" drilling diamonds in their diamond bits. It was believed that by "Orienting" drilling bore in their hard vector direction, that the "cost-per-foot drilled" should be substantially reduced.

Sprague & Henwood's contract drilling department has used over 30,000 "Oriented" diamond bits, and has supplied customers with thousands more. Proof that Sprague & Henwood "Oriented" diamond bits reduces the "cost-per-foot drilled" is explained and outlined in detail in Bulletin #320-1.

All Sprague & Henwood diamond bits are designed to do a specific job, and with information concerning your particular problem, Engineers will suggest and supply you with the Bit, Reaming shells and all accessory equipment necessary to give you the most for your drilling dollar.

Sprague & Henwood has developed four different types of matrices to be used if formation ranging from very soft, to extremely hard or highly abrasive strata.

When you need diamond bits . . . Call Sprague & Henwood in Scranton, the phone number to remember is Diamond 4-8507. You furnish the information on your conditions. They will supply you with the finest diamond drilling bits you can possibly buy anywhere.

**SPECIFY SPRAGUE & HENWOOD FOR FAST...  
DEPENDABLE...RESETTING SERVICE**

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**IMPREGNATED CORING BIT**  
Especially suitable for drilling through hard, broken or extremely abrasive ground, where diamond loss from surface-set bits might be excessive. EX, AX, BX and NX sizes carried in stock. Larger sizes and special designs when required.



**DOUBLE-TUBE  
REAMING SHELL**

Available in all standard sizes for use with all types of double-tube core barrels. Special sizes and types as required. Inserts are tough tungsten-alloy matrix set with carefully selected diamonds.

**"M" SERIES "ORIENTED"  
DIAMOND CORING BIT**

For use with "M" SERIES Core Barrel, when good cores must be secured from soft or friable strata. Available in all four types of matrix and three different grades of diamonds. Also in a complete range of impregnated sizes. EX, AX, BX and NX sizes carried in stock.



**"ORIENTED" DIAMOND  
"TAPER" TYPE NON-CORING  
BIT**

The fastest cutting bit for drilling blast holes in very hard formations. All standard sizes.



**"ORIENTED" DIAMOND  
"PILOT" TYPE NON-CORING  
BIT**

Recommended for drilling blast holes in hard formations and also for use when long straight holes must be drilled in variable formations.



**"ORIENTED" DIAMOND  
"CONCAVE" TYPE  
NON-CORING BIT**

Especially suitable for drilling round smooth holes in relatively soft formations, when cores are not required. All standard sizes available in four different types of matrix.



**"ORIENTED" DIAMOND  
CASING-SHOE BIT**

Available in the same wide range of sizes and types as the standard casing bits and designed so that they can be left on the end of the casing in the hole while drilling is continued through them with the corresponding standard size of core barrel and bit.



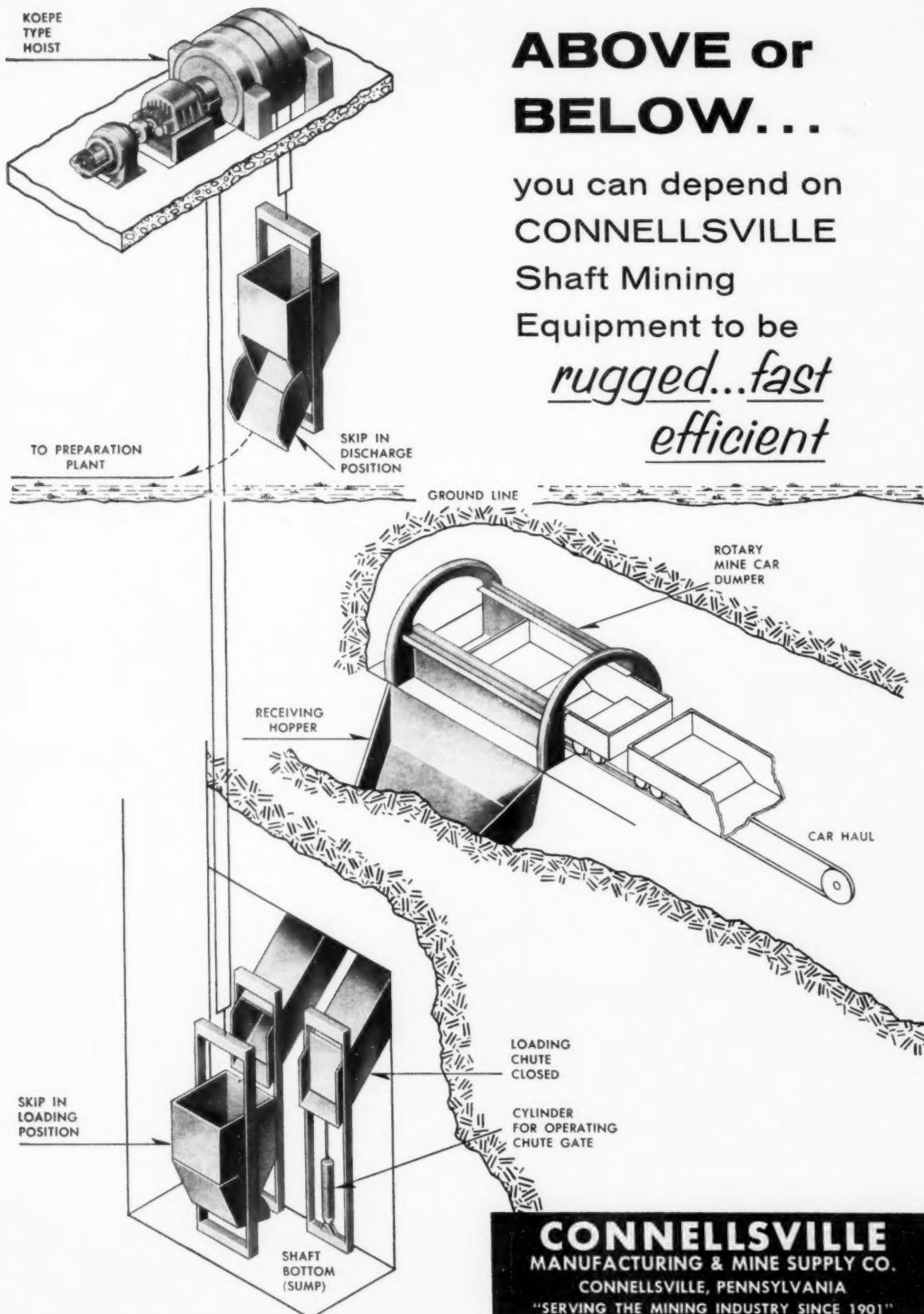
**"ORIENTED" DIAMOND  
STANDARD CASING BIT**

Available in all standard sizes with a choice of four different matrices and three different grades of selected diamonds. Larger sizes and special designs furnished as required. Must be removed before continuing to drill with core barrel and bit.



**"ORIENTED" DIAMOND  
CORING BIT**

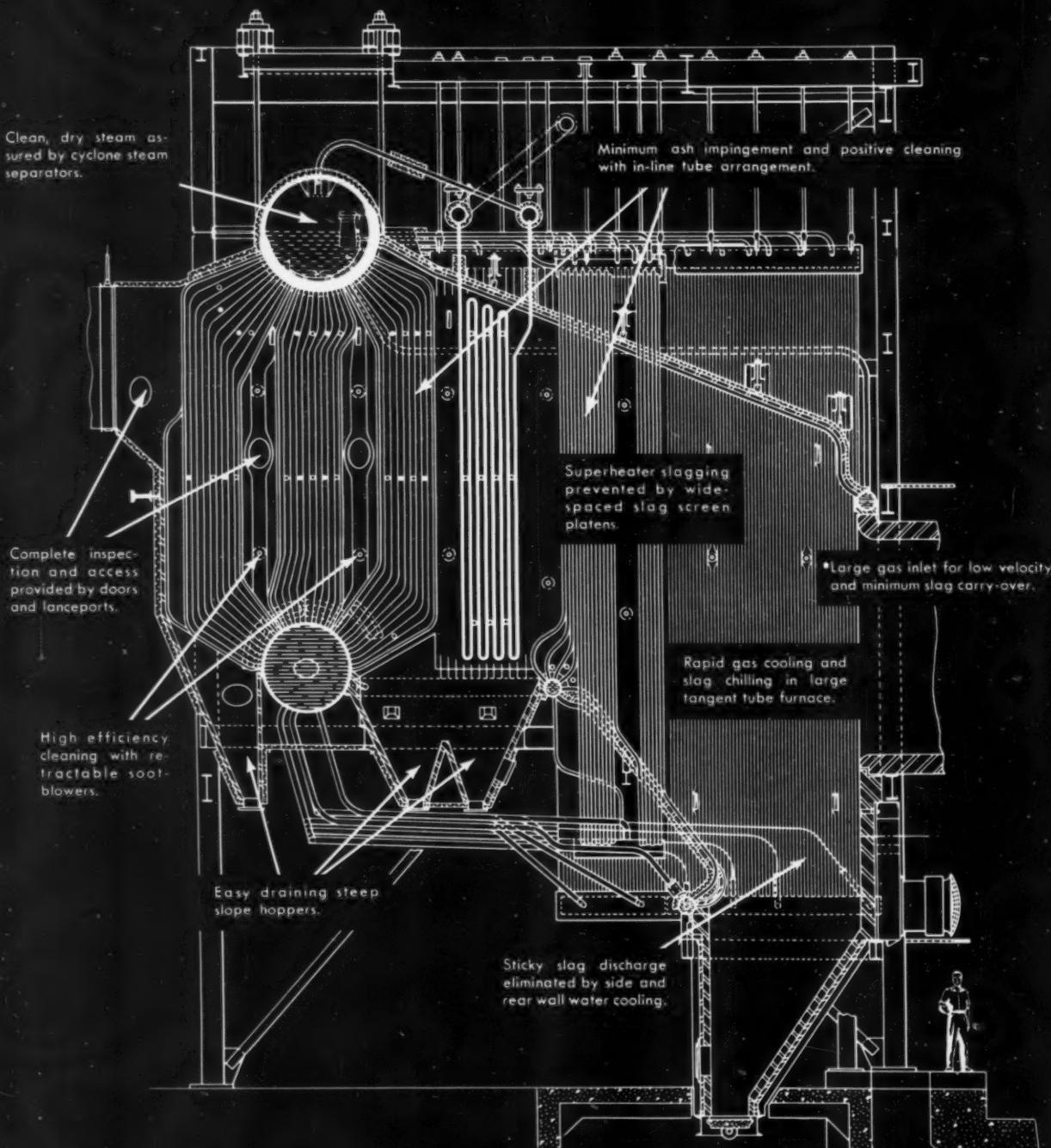
Available in four different matrices and three different grades of correctly-sized diamonds. EX, AX, BX and NX sizes carried in stock. Larger sizes and special designs furnished to meet any specifications or requirements.



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**CONNELLSVILLE**  
Shaft Mining  
Equipment to be  
*rugged...fast  
efficient*

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MANUFACTURING & MINE SUPPLY CO.  
CONNELLSVILLE, PENNSYLVANIA  
"SERVING THE MINING INDUSTRY SINCE 1901"



**These important design features assure trouble-free, continuous operation of this B&W Waste Heat Boiler**

Empresa Nacional de Fundiciones, Paipote, Chile, uses this B&W Waste Heat Recovery Boilerto produce 42,500 lb steam per hour at 400 psig and 700 F at the superheater outlet.

# HOW TO SOLVE WASTE HEAT BOILER PROBLEMS

## B&W heat recovery system ends production bottleneck

A major problem in waste heat boiler operation is the fouling of steam generating surfaces by slag and ash from the process. Frequent outages and excessive labor for boiler cleaning add substantially to the cost of any plant operation. Production delays can result in further serious losses.

For example, the Empresa Nacional de Fundiciones copper smelter at Paipote, Chile was experiencing difficulty in handling high temperature corrosive gases with considerable slag and metallics carry-over. Slagging of boiler surfaces was severely limiting plant production. Unscheduled smelter shutdowns resulted in excessive refractory maintenance, high operating costs, and production losses.

**B&W's engineers** were asked to design a boiler to provide trouble-free operation for these difficult ash and slag conditions. An important requirement was that the new system be installed without interrupt-

ing plant operation. Utilizing the extensive experience gained from similar installations, B&W recommended a special, single pass, low draft loss boiler for the specific plant conditions at Paipote. B&W's recommendations for a completely engineered system were accepted and a waste heat boiler, flues, dust handling equipment, and auxiliaries were furnished.

The successful elimination of the waste heat handling problems, previously limiting production and causing high maintenance costs, has now been proved by several months of operation. In fact, plant production is now above design capacity.

**B&W's extensive research** and engineering facilities, plus its broad field experience in design and operating requirements in the metallurgical process industry, are available to solve your problems. The Babcock & Wilcox Company, Boiler Division, 161 East 42nd Street, New York 17, N. Y.





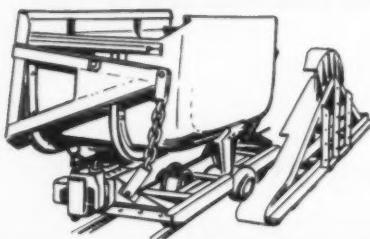
# FOR YOUR PRODUCTION

Our shops are known to mining men throughout the world for custom building of mine cars and other haulage equipment. Here are some of the standard and custom designed items made by Card. For complete information, write or phone.

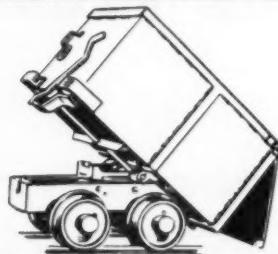
Frequently modification of a standard Card

car will serve to meet every specification of special haulage at very little more than the cost of a standard car. Our engineers can show you how to standardize your mine haulage with cars that are custom built for you alone. Many mine operators find they cannot afford even to make car

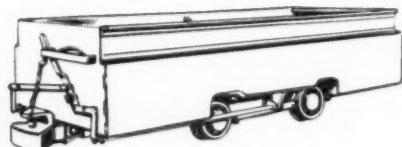
Granby Car with Dump Block



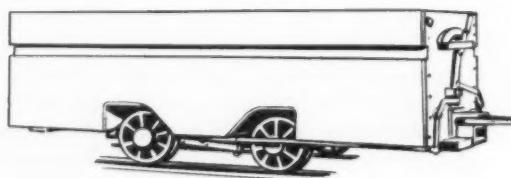
End Dump Turntable Type 2



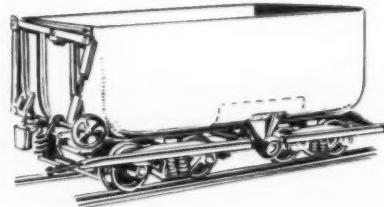
All-steel Rotary Dump Car



All-steel Rotary Dump Car



Large Capacity Granby Car with Mechanical Brakes



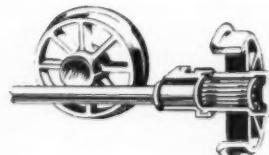
## Coal Mine Cars

- Ore and Industrial Cars
- Mine Car Wheels & Trucks
- Sheaves—Rope, Knuckle, Curve
- Track Rope Rollers, Slope Rollers
- Carrying Sheaves, Swivels, Hitchings
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- Automatic and Plain Cages
- Skips and Dumps
- Revolving Screens
- Perforated Screen Plates
- Truckloaders
- Track Turnouts
- Frogs, Crossovers, Guard Rails
- Split Switches
- Switch Stands
- Track Turntables
- Rail Sections and Parts

Bicycle Spoke Sheaves



Card Roller Bearing Truck



Card Timken Bearing Truck

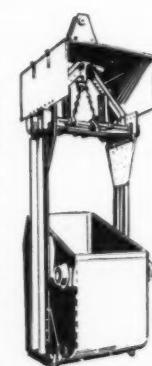


Be your production large or small, Card can fit your needs—economically. Our engineers are available for consultation on your haulage problem. No obligation.

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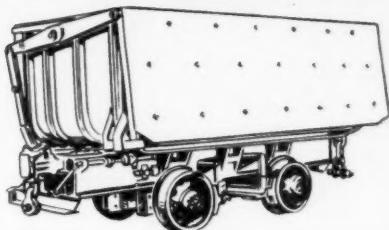
# HAULAGE Pick a winning Card!

bodies and repair parts...Card prices are lower even after freight costs are added.

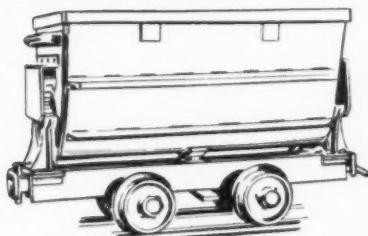
Note the partial list of customers below. Some are now replacing original orders after 10-20 years...with Cards, of course.



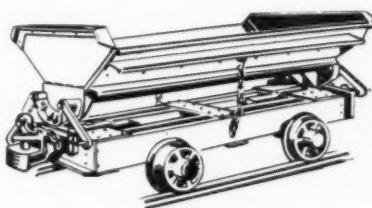
A Popular Granby-Type Car



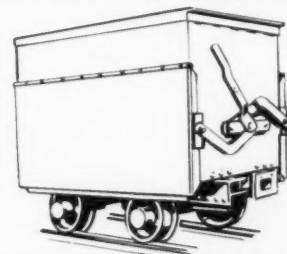
Rocker Dump Car



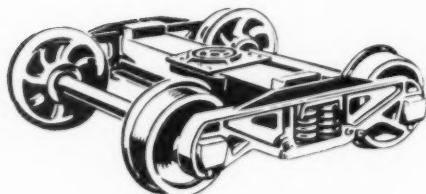
Rocker Dump Car, extra low



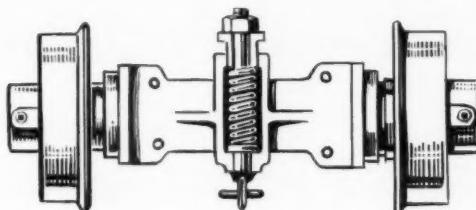
Gable Bottom Type Car



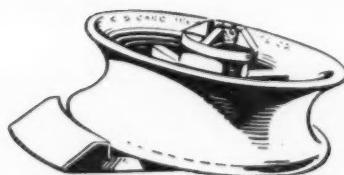
Spring Mounted Bolster Truck



Patented Spring Drawbar Truck



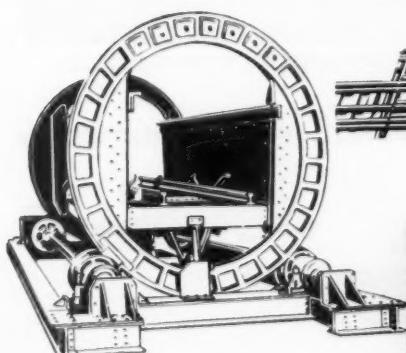
Cord Curve Sheave



Roller Bearing Track Rope Roller



Cord Power Driven Rotary Dump



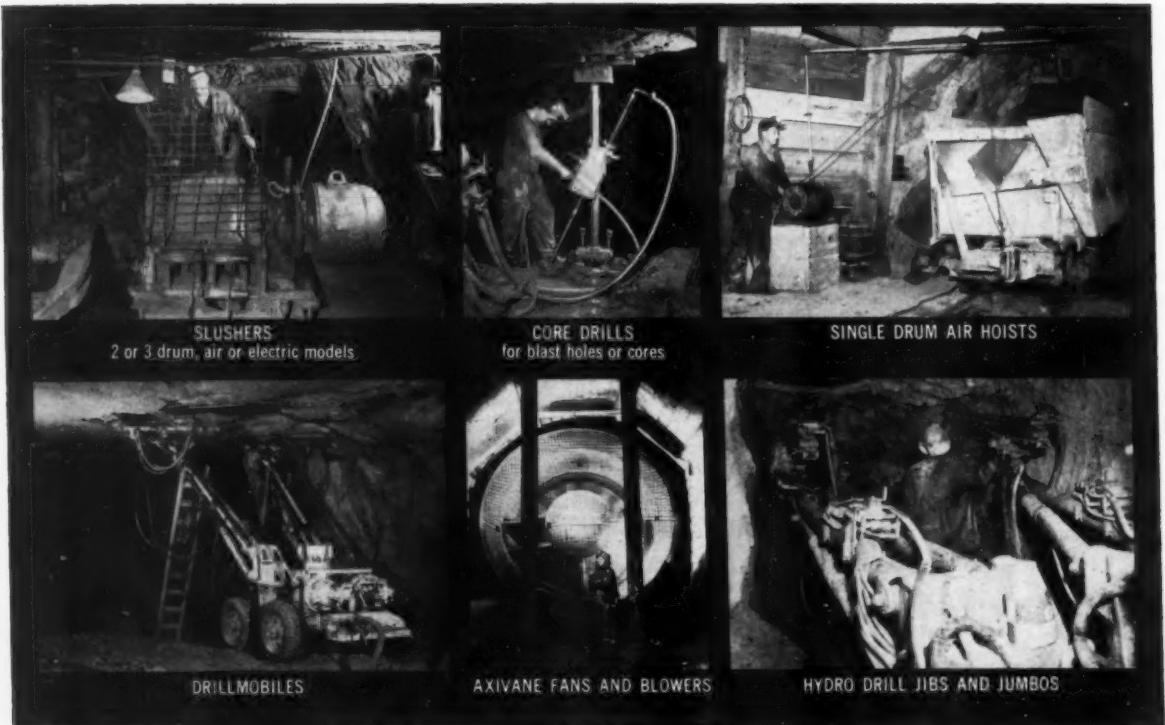
Example of Cord Track Equipment



CLIMAX MOLYBDENUM  
INTERNATIONAL MINERALS  
PHELPS DODGE  
KENNECOTT COPPER  
U. S. VANADIUM  
U. S. POTASH  
VERMONT COPPER  
HOWE SOUND  
CALERA MINING  
HOMESTAKE  
TELLURIDE MINES  
IDARADO  
CANANEA CONSOLIDATED  
COPPER CO.  
ANACONDA  
VICTOR CHEMICAL WORKS  
CLEVELAND CLIFFS IRON  
POTASH CO. OF AMERICA  
CONSOLIDATED MINING &  
SMELTING CO. OF CANADA  
AMERICAN SMELT. & REF.  
UNITED STATES SMELT. REF.  
& MINING  
UNION PACIFIC COAL  
GENEVA COAL CO.  
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**C.S. Card Iron Works Co.**

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*Speed Development...  
Increase Production*

**WITH MODERN**

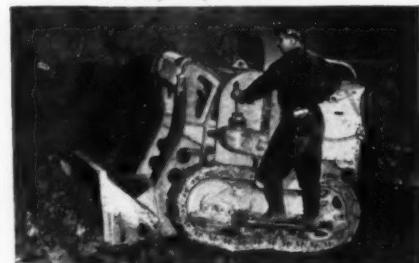
### **JOY MINING EQUIPMENT**

#### **JOY MANUFACTURING COMPANY**

Oliver Building, Pittsburgh 22, Pa. In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario.



**AIR COMPRESSORS**  
Stationary and portable models



SHOVEL LOADERS IN ELECTRIC OR AIR MODELS



TUNGSTEN CARBIDE  
INSERT ROCK BITS



STOPERS



AIR LEGS

**JOY... EQUIPMENT FOR MINING... FOR ALL INDUSTRY**

HIGH PRESSURE  
HYDRAULIC DRILLS



DRIFTERS

# THE DEISTER CONCENTRATOR COMPANY

**CONCENCO<sup>®</sup>**  
PRODUCTS

The Original Deister Company—Incorporated 1906  
Manufacturers of Vibrating Screens, Ore Concentrating and Material Washing Tables

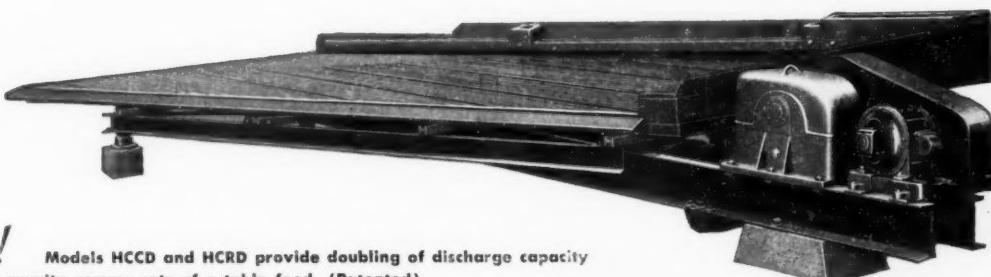
**CONCENCO<sup>®</sup>**  
PRODUCTS

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Pennsylvania Sales ..... 35 E. Center St., Nesquehoning, Pa.  
Alabama Sales ..... 2612 North 24th St., Birmingham, Ala.

The Galigher Co., 545 West Eighth South St., Salt Lake City 10, Utah  
Drilling & Mining Equipment Co., 2020 Sacramento St., Los Angeles, Cal.  
Adelman Machinery Co. .... 520 First Ave. South, Seattle, Washington

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## *SuperDuty<sup>®</sup>* DIAGONAL-DECK<sup>®</sup> CONCENTRATING TABLES



*New!*

Models HCCD and HCRD provide doubling of discharge capacity  
for high gravity components of a table feed. (Patented)

### DIAGONAL-DECK Tables

Our DIAGONAL-DECK Concentrating Tables have been accepted as the standard the world over for more than a quarter of a century. Leading this line of outstanding and time proven tables is the *SuperDuty* DIAGONAL-DECK table, firmly established by substantial commercial applications as the most advanced in features, performance and practical advantages.

### THE *SuperDuty* TABLE

- ◆ OFFERS HIGHER CAPACITY—Small middling loads, a direct result of the DIAGONAL-DECK design, plus greater efficiency of CONCENCO Head Motion means more tons of new feed handled per day per table.
- ◆ SURPASSES IN RECOVERY any other concentrating table built while maintaining comparable or higher feed and product capacity.
- ◆ MAKES HIGHER GRADE PRODUCTS because "flanning out" action of the DIAGONAL-DECK design permits more accurate cutting of product yield.
- ◆ YIELDS THE GREATEST PROFIT by its overall efficiency in performance and matchless operating economy.
- ◆ REQUIRES ONLY 2 H.P. Motor on the No. 6 Ore Table for starting and substantially  $\frac{1}{2}$  H.P. under continuous operation. The No. 7 Coal Washing Table requires only a 3 H.P. motor to start and substantially 1 H.P. under continuous operation.
- ◆ OFFERS A RECORD MAKING HEAD MOTION. The CONCENCO Anti-Friction Head Motion is a modern, efficient mechanism far ahead of the field. First in application of anti-friction bearings, its leadership has been maintained over two decades. Outstanding performance is fully verified through field-wide acceptance.
- ◆ IS THE SMOOTHEST AND EASIEST RUNNING table ever built, by virtue of its sturdy balanced supports, deck operating design and outstanding head motion.
- ◆ IS A COMPLETE MACHINE—embracing more than just a head motion, deck and a few slide bearing units requiring the addition of adequate frame and support elements to build into a finished and properly aligned machine that can be completed only at user's full responsibility and extra expense.
- ◆ CANNOT BE EQUALLED FOR LOW COSTS in operation and maintenance.
- ◆ IS DEFINITELY OUT IN FRONT as your best, safest and most profitable choice considering both your investment and operating dollars.



### *SuperDuty* DIAGONAL-DECK Ore Tables

**Minerals—Metallic**—For the recovery of mineral values from gangue, for the differential separation of complex minerals, DIAGONAL-DECK Deister-Overstrom Tables long proved their value. A logical development from these sturdy forerunners, the Super-Duty DIAGONAL-DECK Concentrating Table is today proving itself the most highly developed and successful wet gravity concentrating apparatus in the world's leading mills. Used ahead of flotation, these tables effectively eliminate barren coarse gangue and reduce the tonnage for fine grinding; relieve the pulp of a large part of the mineral load and lessen the burden on the more intricate flotation process. Following flotation, tables are used to recover the tarnished, oxidized or carbonate mineral particles that are so ineffectively recovered by flotation.

SuperDuty DIAGONAL-DECK Tables used as pilots in flotation guide the operator in regulating the flotation oils and reagents. Pilots are used on concentrates, middlings, intermediate products, tailings and are placed in various parts of the flow-sheet.

On carbonate or oxidized ores especially, these tables have proven the simplest and most economical method of concentration.

**Minerals—Non-Metallic**—The use of tables on non-metallic minerals is now general. For the separation of silica, feldspar, iron and granular particles from kaolin and in the recovery of mica, garnet, silica, cyanite, barytes, fluorspar, graphite, phosphate, potash, etc., tables have proven their commercial value. SuperDuty DIAGONAL-DECK Tables are used successfully on the most difficult separations; for example: the differential concentration of barite-iron-silica or garnet-silica-mica.

**Recovery of Values from Residues**—The residual sands and ashes resulting from operation of brass and other metal foundries have a high metallic content. Formerly this sand was washed by hand and an inefficient recovery made. SuperDuty tables are now used on foundry residue and efficient recovery is made of even the very finest metallics. Copper, brass, tungsten, zinc and many other metals are recovered from waste materials at a substantial profit.

### WRITE FOR CATALOGS

Patents on equipment owned or controlled by The Deister Concentrator Co. Trade-marks registered in U.S. and foreign countries.

***SuperDuty* DIAGONAL-DECK Coal Washing Tables**

The SuperDuty DIAGONAL-DECK Table cleans either bituminous or anthracite coal. Although most widely used on the sizes finer than  $\frac{3}{4}$ ", installations on sizes up to  $1\frac{1}{4}$ " are eminently successful. Conversely, because of ultra mobility and smoothness of deck operation, effective work is now possible on extremely fine sizes—within the minus 48 mesh range. Clean coal is being recovered in many instances from the refuse products of other coal cleaning devices, both with and without recrushing. Another source of table feed is the undersize from dewatering screens which follow other coal cleaning machines. Reject materials forming culm banks, river deposits and waste piles may in many instances be reclaimed. In fact, the Super-Duty table may be used on any cleaning problem where there is a specific gravity difference between relatively free particles of coal and refuse.

**Design**—*SuperDuty* DIAGONAL-DECK Coal Washing Tables are designed for efficient cleaning of coal, especially those sizes which jigs and similar machines fail to handle efficiently and profitably.

**Installation**—DIAGONAL-DECK Coal Washing Tables may be installed singly or in battery. Number of tables required is governed by tonnage to be handled. Tables in battery installation operate as independent units, consequently, individual tables may be cut in or out to meet variations in production schedule profitably.

**Investment**—*SuperDuty* DIAGONAL-DECK Coal Washing Tables represent the lowest initial investment regardless of size of installation. These tables meet the requirements for efficient cleaning, low operating costs and production flexibility.

**Operation**—This process, employing wet gravity principles, offers the greatest simplicity in operation, while full visibility of separation accounts for the finest results by unskilled attendants.

No other process can equal their performance on sizes  $1\frac{1}{4}$ " to finest dust. High efficiency is attested by their elimination of 90% or better of the free impurities including slate, sulphur, pyrite, shale, fire clay, gravel, bone and tramp iron. Simultaneously loss of coal to refuse is minimized beyond the possibilities of other processes.

**Capacities**—Depending on type and size of coal, washability and cleaning requirements, capacities of DIAGONAL-DECK Tables run from 4 to 20 tons per hour.

**New Specialized Models**—The new Models HCRD and HCCD are specialized designs of the No. 7 and No. 6 sizes, respectively, of the SuperDuty DIAGONAL-DECK Concentrating Table. In these models, that portion of the deck periphery available for discharging high gravity feed components is doubled, without subtracting from the low-gravity discharge periphery, thereby doubling available high-gravity discharge capacity, with attendant increase in table feed capacity. These models are intended for the high capacity handling of feeds wherein the high-gravity fraction represents a relatively large percentage of the total. Phosphate rock, coal and the ores of iron and chrome provide typical fields for application. For other feeds, wherein the high-gravity fraction represents a relatively small percentage of the total, the well known, regular models of SuperDuty DIAGONAL-DECK Concentrating Tables are applicable, as in the past.

**CONCENCO® DISTRIBUTORS**

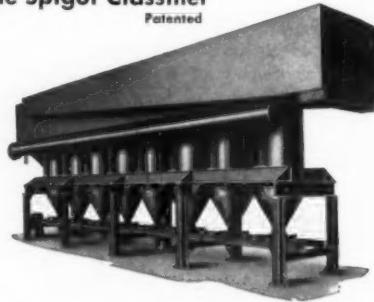
The CONCENCO Revolving Feed Distributor, built in six types, is a heavily fabricated, all steel machine with motor drive requiring only  $\frac{1}{4}$  H.P. in operation. The Distributor effects perfectly a splitting of feed sluiced to its revolving tank, into any desired number of equal portions from two to sixteen, in some cases more. It is especially suitable for efficiently feeding any number of circuits or machines in battery for higher overall efficiency. It is unexcelled for feeding concentrating tables.

**CONCENCO® CPC Classifiers**

CONCENCO Constriction Plate Classifiers of all steel welded construction are furnished in any number of cells from 2 to 14 to meet requirements. Each cell is square in horizontal cross section and consists of three chambers: the pressure chamber at the bottom; the sorting column immediately above and separated from the pressure chamber by a constriction plate; and the launder section above the sorting column, which is materially increased in cross section to reduce velocity of flow.

**CONCENCO® *Super Sorter*****Giant High Tonnage  
Multiple Spigot Classifier**

Patented



The CONCENCO SuperSorter does what engineering opinion had formerly held to be impossible . . . it sorts granular materials hydraulically into a number of uniform, graded products on a low cost, high tonnage basis. The barriers of the past have been overcome in the CONCENCO giant classifier, which maintains teeter and zone densities hitherto considered impossible in large cell cross-sections needed for handling substantial capacities.

**Applications**

The CONCENCO SuperSorter meets that long-felt need for a multiple spigot, rising current classifier of sufficiently high capacity to handle economically coal, sand, iron ore, phosphate rock and similar granular minerals.

**Capacities and Performance**

The first battery of four 8-cell units installed has been in successful commercial operation for over eight years, classifying  $\frac{1}{4}$ " x 0" feed to a large battery of coal washing tables. Each SuperSorter unit handles in excess of 100 tons per hour, demonstrating phenomenal performance for both tonnage and efficiency. In the production of concrete sand, to the strictest engineering specifications, the SuperSorter has proved eminently successful. On minus 8 mesh sand, an 8-cell unit produces 130 tons per hour of accurately classified products.

**Dimensions**

The size and proportions of the CONCENCO SuperSorter may be quickly visualized from the following general data covering the 8-cell machine. The overall height, including 6" H-section supporting legs, is 14 feet. It is 6 feet wide and 40 feet long. Approximate weight, empty, is 16 tons.

**Operation**

A feature of the CONCENCO SuperSorter is the innovation for control of spigot discharge. Each classified spigot product is intermittently drawn off, with measured precision, from a quiescent bed at the bottom of the cell. High capacity discharge of product is maintained with minimum water content and without disturbing the rising water currents or unbalancing classification in the sorting column immediately above. The novel constrictor valve mechanisms that control the draw-off from each cell are readily adjustable in operation over a wide operating range from open 90%, to closed during 100% of each cycle. The Constrictor valves permit a positively measured and uniform discharge rate from each cell—a condition essential to the high efficiency of the SuperSorter and to overall efficiency when operating in conjunction with concentrating tables or similar devices.

**Water and Power Requirements**

Water requirement is low for apparatus of this type. Hydraulic water is brought to the individual cells by means of a 12" header pipe and regulated with easily adjustable pinch valves. The only power required is for actuation of the tandem operated constrictor valve mechanism. A 1½ horsepower motor with gear reducer amply provides for even the largest multiple cell units. There being no other moving parts, operating costs are amazingly low.

**Range**

CONCENCO SuperSorters are now available in a range of sizes to meet the needs of any high tonnage classification problem. The individual cells are incorporated with a rectangular, partitioned tank provided with feed entry, adjustable overflow weirs and overflow exit. All construction is of heavy type.

**Leahy® SCREEN . . . New Model E**  
Now Available with FlexElex  
Heating of the Jacket

Due to their rugged construction and mechanical simplicity, Leahy Vibrating screens far outdistance other devices in overall equipment life.

The heavy duty vibrator, doubly dust-proofed type and enclosed, and forming an integral part of the structural steel bridge assembly, delivers a stronger and more positive vibration than ever before, superenergizing every square inch of screen jacket with the characteristic stratifying-screening-unblinding vibration, that is so highly acclaimed and profitably enjoyed by Leahy screen users.

Leahy differential vibration guarantees open meshes, which in turn insure higher screening efficiency and capacity.

**Uses**—For wet or dry screening from 3" opening down to fine mesh; also for dewatering and heavy media recovery. Unexcelled for screening at fine meshes.

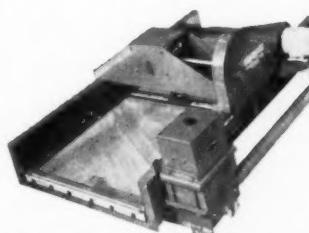
**Features**—The new Model E Leahy Screen has simplicity combined with proved ruggedness. Installation is inexpensive, with supports figured for dead load only, because no vibration goes into the screen frame or supports, and only ½ H.P. is used to operate. The heavy duty vibrator, running-in-oil at 265 r.p.m., produces 1200 to 2000 v.p.m. as needed. Maintenance is negligible—averaging less than 1% of first cost annually. Screen jacket economy is reflected in costs as low as \$0.000574 per ton treated. The quickest jacket change feature offered in screening equipment combines with the use of reasonably priced stock jackets of woven wire and, with some models, perforated plates.

**Types and Sizes**—Open type, totally enclosed dustproof type; single or double surface; belt drive or motor drive



The Guaranteed Screen

in sizes: 17x32 in.; 2x4 ft.; 3x5 ft.; 3x6 ft.; 3x7 ft.; 4x5 ft.; 4x6 ft.; 4x7 ft.; 4x8 ft.; 5x6 ft.; 5x7 ft.; 5x8 ft. Size designation indicates the overall dimensions of the screen jacket. Special sizes built to order.

**FlexElex® Electric Heating of Wire Screen Cloth**

The FlexElex heating arrangement is engineered especially for fine mesh screening of damp materials such as ores, fine coal, clays, shales, pulverized limestone, chemicals, etc.

A low voltage, high amperage electric current is passed through the screen cloth, causing it to heat sufficiently

that the wires are kept warm and dry, to prevent any build-up of dust-size fines that contribute to blinding.

When the advantages of FlexElex heating are added to the Leahy unblinding action for disposing of intermediate size particles, the result is an efficiency and capacity never before achieved in the screening field. Screening at an accustomed mesh, capacity is stepped up to an astounding degree. On the other hand the same capacity may be maintained with smaller mesh openings formerly considered impractical.

**DESCRIPTION.** The FlexElex electric jacket heating system for the average size Leahy Screen comprises: a 15 KVA dry type single phase transformer with line voltage primary and low voltage secondary, complete with controls for closer adjustment of current and heat used. Short, high capacity aluminum bus bars connecting transformer to aluminum mounting bars at jacket eliminate flexible cables or connections in the heating circuit. Highest electrical and thermal efficiency is assured by the most practical design of circuit and heavy bus bars of generous cross section in laminated assembly with airgap spacing.

**POWER REQUIRED** for the average size screen amounts to only 9 or 10 KVA under normal temperature and moisture ranges. With the FlexElex system it is easy to regulate the current to meet day to day or season to season operating conditions with optimum results at minimum power consumption.

**SCREEN JACKET CHANGE TIME.** Screen jacket changes can be made with the same ease as with conventional type Leahy Screens. Furthermore, jackets need not be changed as often. Field experience shows that even with less expensive grades of cloth, the life of electrically heated jackets, requiring no beating or brushing, is several times that of unheated cloth.

**OVERALL ECONOMICS.** Users say that the elimination of attendants for cleaning screen cloth, as well as materially reduced power consumption for grinding (resulting from the accompanying reduction of circulating load, credited to increased screening efficiency of FlexElex equipped screens), generally more than offsets the cost of the equipment and power used to heat the screen cloth.

**CONCENCO Spray Nozzle—Water Sprays**

CONCENCO Spray Nozzles are unique and efficient. They are easy to apply. A hole is drilled in the pipe and the nozzle bolts on by means of a brass "U" bolt. No threading is necessary. The jet is a flat line spray very effective in washing or screening.

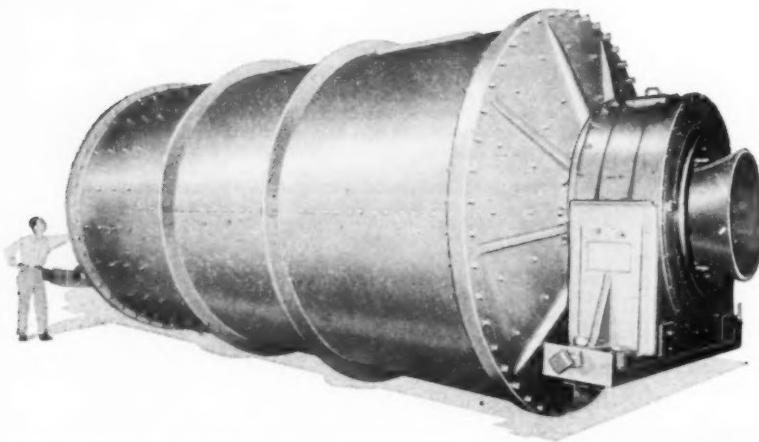
The jets can be perfectly aligned one with another for sheet flow washing. The J-132 series with orifices of  $\frac{1}{16}$ " to  $\frac{1}{8}$ " fit 1" to 2" pipe. The J-136 series with orifices of  $\frac{1}{16}$ " to  $\frac{1}{4}$ " fit 2" to 4" pipe.



# KENNEDY...

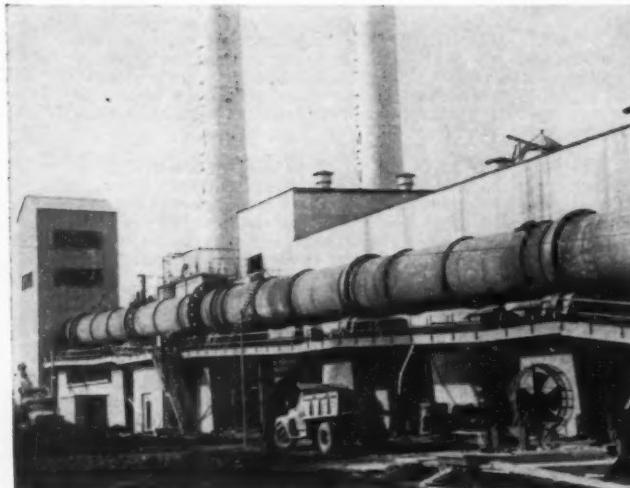
We manufacture everything from a crusher to a conveyor system. Complete KVS Mining Plants are in use throughout the world, engineered to

meet specific requirements for handling all types of rock and ore. Consultations with KVS engineers can be arranged anywhere . . . any time!

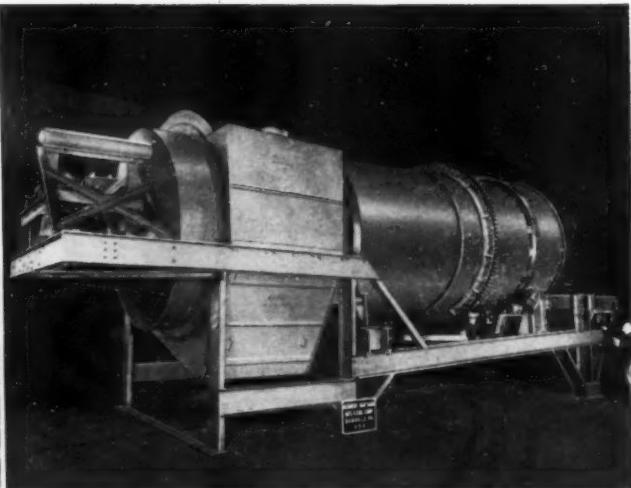


## BALL, ROD, TUBE MILLS

For grinding and pulverizing; wet or dry process—any dimensions or capacities.



**ROTARY KILNS:** Heavy Duty...Cement...Wet or Dry Process, Lime, Calcined Coke, Dead Burned Dolomite, Nodulizing and Agglomerating.



**BALLING DRUM** For pelletizing iron ore.

*Send for Bulletin describing KVS Machinery and Equipment.*

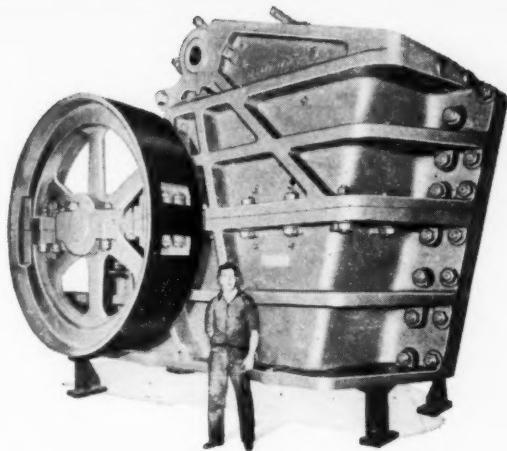
# KENNEDY-VAN SAUN

# Machinery and Equipment for the Mining Industry...



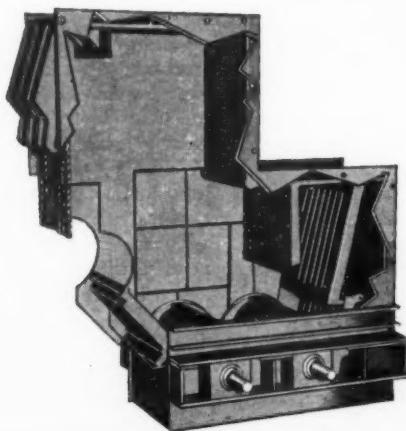
## GEARLESS GYRATORY CRUSHERS

Primary and Secondary—Noted for efficiency in crushing. Wide range of sizes and capacities—V-Belt Drive or synchronous motor, built integral into pulley.



## SWING JAW CRUSHER

Heavy Duty . . . Wide Range of Sizes. Jaw plates reversible. Frames of larger sizes built in four sections. Shaft cast integral with Swing Jaw. Automatic Lubrication System.



## CUBER SENIOR IMPACT BREAKER

Multi-stage, regulated flow impact breaker for primary and secondary crushing. Dual rotor, triple action. Available in stationary or portable models.

## KENNEDY PRODUCTS

- Gyratory Crushers
- Swing Jaw Crushers
- Tube Mills
- Ball & Rod Mills
- Vibrating Screens
- Rock Feeders
- Air Swept Tube Mills
- Rotary Kilns
- Coolers, Dryers
- Preheaters, Deheaters
- Belts, Conveyors
- Pneumatic Transport Systems
- Waste Heat Boilers
- Pulverized Coal Firing Systems
- Steam Generators
- Asbestos Plants
- Complete Lime Plants
- Complete Cement Plants
- Complete Aggregate Processing Plants

MANUFACTURING & ENGINEERING CORPORATION  
405 PARK AVENUE, NEW YORK 22, N.Y. • FACTORY: DANVILLE, PA.

# AMSCO®



## AMSCO DIPPERS

**Designed for speed, heavy duty . . . Cast of 12-14% Manganese Steel to wear longer**

Renewable lip—2-piece welded designs—backhoes—Mesabi dredge types—special-purpose designs on order—complete line of accessories.

Streamlined jutting lip and fanned teeth bite up full loads at normal power. Angled bottom means less crowd, reduces heeling, makes digging fast and easy.

You get extra wear because they're cast of tough Amsco manganese steel—work-hardening, abrasion resistant. It won't break. Resists cracking. Weighs no more than comparable fabricated dippers, same capacity.

*Special features include:* (1) rubber-cushioned door (optional); (2) plug-welded side seams; (3) integrally cast lugs on dipper backs; (4) cast-in pin connecting lugs; (5) interchangeability of repair parts.

Write for *Amsco Power Shovel Equipment* booklet to be available soon, containing complete details for all types.



Amsco backhoes feature the faster, easier-digging, streamlined design common to all Amsco dippers . . . plus the high strength and wear resistance of manganese steel.



Amsco lightweight, two-piece, welded dippers take heavy-duty digging shift after shift . . . withstanding abuse, conserving power, making every load a full load.

## ...digging



## AMSCO crusher and breaker parts

**Won't break! Work-harden under impact!**  
**Cast of "toughest steel known"!**

Amsco makes manganese steel crusher and breaker parts for most major manufacturers of crushing, grinding and pulverizing equipment. Improved resistance to wear because the surface of manganese steel work-hardens under repeated impact up to 500 Brinell. Yet, beneath the working surface, the metal remains strong and ductile, able to give slightly under crushing forces . . . absorbing abuse, resisting cracking or chipping, even when worn thin. *Buy your replacement parts from your crusher manufacturer to be sure of getting Amsco manganese steel.*



Amsco manganese steel ball mill liners work-harden to a degree that further abrasion only polishes the hard surface of the metal, reducing wear rate tremendously.



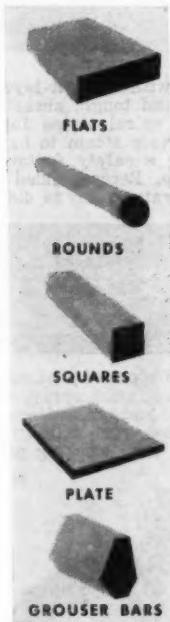
Amsco crusher concaves and mantles add extra service life to cone crushers of all types.

# crushing, wear-fighter line

## EASY TO WELD

**AMSCO SHAPES—REPOINTERS cast of 12-14% manganese steel**

Reinforce points of extreme wear with work-hardening Amsco 14% manganese steel shapes. Truck beds, chutes, crushers, blades, dipper interiors... wherever impact and abrasion cause early wear-out. Amsco shapes are easy to weld, manganese to manganese, or manganese to carbon steel. Size range is complete to fit all equipment.



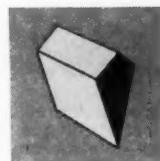
### Wear-Sharp repointers\*

Work up to 6 times longer than standard repointers. Corners won't blunt. Entire leading edge wears evenly.



### Repointer bars

Three-foot bar lengths. Also ideal for rebuilding worn lips of all digging equipment.

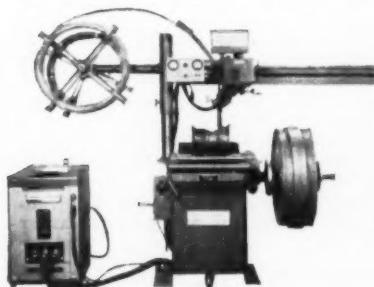


### Cast-to-shape repointers

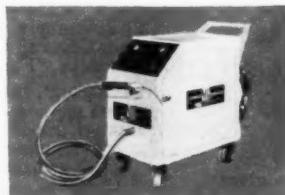
For fast, easy repointing of teeth used in less severe digging. Applied in 15 minutes, using only two electrodes.



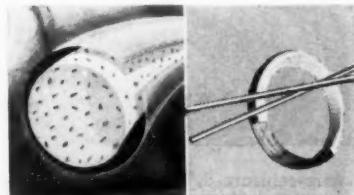
## FULL WEAR-FIGHTER LINE OF AMSCO HARDFACING WELDING EQUIPMENT AND MATERIALS



Automatic welders



Semi-automatic MF welders



Manual, automatic rods & electrodes

Now you can get a hardfacing material to lick every type of wear. Impact alone! Impact plus abrasion! Abrasion alone! Amsco's line is complete and includes the new high-speed, more economical *tube rod* for semi-automatic build-up and repair. You'll save hours of down time, reduce welding time and materials cost... plus extending service life of your equipment... by using Amsco machines and hardfacing materials. Write for a complete description of this wear-fighter line.

\*REG. U. S. PAT. OFF.



**AMSCO**  
AMERICAN MANGANESE STEEL DIVISION  
CHICAGO HEIGHTS, ILLINOIS



# GOODALL RUBBER COMPANY

GENERAL OFFICES, MILLS and EXPORT DIVISION: 430 WHITEHEAD ROAD, TRENTON 4, N. J.

BRANCHES: PHILADELPHIA • NEW YORK • BOSTON • PITTSBURGH • INDIANAPOLIS • CHICAGO • DETROIT  
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Goodall Rubber Company of Canada, Ltd., Toronto

Distributors in Other Principal Cities.



## "BROWN CORD" AIR HOSE

Sizes  $\frac{1}{2}$ " to 1", I.D.

A molded-and-braided hose for drilling, riveting, and other general pneumatic tool service. Tube, carcass and cover are combined to assure great strength and durability, without impairing flexibility and easy handling. Oilproof tube; rubber cover. Available in lengths up to 500 feet.



## "SUBWAY" AIR HOSE

Sizes  $\frac{1}{2}$ " to  $1\frac{1}{4}$ ", I.D.

Another Goodall "Standard of Quality" hose especially built for rock drilling and all other heavy-duty air tool work. Light weight, flexible, easy to handle. Tough, oil-proof black rubber tube; highest quality wrapped duck carcass; wear- and weather-resistant red rubber cover, with yellow criss-cross stripe. Maximum lengths of 50 feet.



## "HARDROK" WIRE BRAID AIR HOSE

"Standard of Quality"

A super-hose for rock drills in construction, quarrying, mining and any other heavy-duty air service. Longwearing, oilproof Synplastic tube; horizontally braided steel wire carcass; tough yellow rubber cover, with black spiral stripe for identification. Light in weight, extremely flexible. Sizes  $\frac{1}{2}$ " to 2", inclusive; two and three braid.



## "NEWTYPE" SUCTION AND DISCHARGE

Patented wire-reinforced, woven cord construction gives "Newtype" unusual strength and durability for both suction and discharge. Light weight, extremely flexible. Cannot kink, buckle or collapse, yet if accidentally crushed, can be quickly rounded into shape again without harm. Smooth bore. Sizes 1" to 4", I.D. Max. lengths of 50 feet. Black cover, green spiral stripe.



## "BUCKSKIN" WATER HOSE

Sizes  $\frac{1}{2}$ " to 4", I.D.

Long famous for quality and reliability in every water hose service. Tube is of slow-aging rubber stock—tough and pliable. Strong rubber cover withstands roughest surface wear and abuse, and affords maximum protection to cotton duck carcass from contact with moisture. Maximum lengths of 50 feet.



## "INFERNO" STEAM HOSE

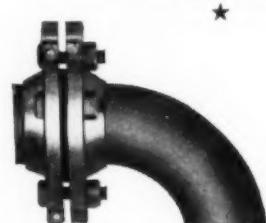
Sizes  $\frac{1}{2}$ " to  $2\frac{1}{2}$ ", I.D.

Built with multiple-layer wire braid carcass, heat-resistant tube and tough, abrasion-resistant red rubber cover with black spiral stripe for easy identification. Wire braids will cause steam to be diffused from damaged hose, providing a safety factor against sudden burst. Extremely flexible. Recommended for pressure up to 200 lbs., and temperatures up to 400°F. Maximum lengths of 50 feet.



## "ALL SERV" General Purpose HOSE

For all types of pneumatic tools—also water, oil, chemicals, gasoline, paint spray, etc. A very flexible all-Synplastic molded-and-braided hose, in one, two or three braid construction, with tough wear-resistant red cover. Sizes  $\frac{1}{4}$ " to  $1\frac{1}{2}$ ", for working pressures from 200 lbs. to 300 lbs.



## "KEMITE" DUCT WITH "FLANG-LOK" Floating Flanges

For mine suction and discharge. Tube offers highest resistance to abrasive wear. Wire-reinforced carcass will not kink or collapse. Cover is tough, long-wearing rubber compound. Generally furnished with "Flang-Lok" Ends, to accommodate "Flang-Lok" Flanges. Sizes up to 4", I.D.

"FLANG-LOK" FLANGES provide the most convenient and efficient method of connecting "Kemite" Duct, effecting a leakproof, rubber-to-rubber seal, and permitting full flow. For bolt alignment, flanges turn independently of the duct or pipe. No gaskets or washers. All sizes.

"GOODIE" FLEXIBLE PIPE. Same construction and advantages as "Kemite" Duct, above, but available in larger sizes—up to 12", I.D.

## "LONG-LIFE" PLASTIC PIPE

Goodall "Long-Life" Plastic Pipe is made in three types—Flexible, Semi-Rigid and Rigid—under conditions assuring the highest degree of quality and uniformity. The Flexible type is produced from virgin Polyethylene in Standard Wall, 75 lb. Job Rated and 100 lb. Job Rated, all certified non-toxic by N.S.F.

"Long-Life" Semi-Rigid Plastic Pipe is the Cellulose Acetate Butyrate type and is available in Standard Wall, sizes  $\frac{1}{2}$ " to 6" inclusive.

The Rigid Type is a compound of unplasticized Polyvinyl Chloride (PVC)—well known for its superior impact and tensile strength and great resistance to a wide range of industrial chemicals. Made in Wall Thickness Schedules 40, 80 and 120, in sizes  $\frac{1}{2}$ " to 8".

The GOODALL Trademark on hose, belting, boots and clothing for the Mining Industry represents a standard of quality and reliability established through sixty-eight years of manufacturing experience, backed by continuing research and development. Product specifications are based on first-hand knowledge of mine service requirements, with selected materials, expert craftsmanship and careful inspection assuring the utmost in on-the-job performance and economy.



EST. 1870



#### CONVEYOR BELTING

**"SUPER TRIPLE-S."** Goodall's finest grade. Heavy duck carcass, high tensile rubber covers and strong friction between plies. Designed to carry run-o-mine coal, ores, slag and crushed limestone up to 10", wet or dry. Widths up to 48".

**"TRIPLE-S."** Same superior quality as "Super Triple-S," but of somewhat lighter construction. Widths up to 48".

**"GOODALL."** The right belt for the great number of lighter conveying jobs where the *extra* qualities of "Super Triple-S" and "Triple-S" are not required. For sized coal, crushed stone, gravel, shells, ashes, etc. Widths up to 48".

#### ELEVATOR BELTING

"SUPER TRIPLE-S," "TRIPLE-S" and "LA CROSSE" are long-established Goodall brands, built to specifications that assure reliable, economical service under conditions for which each is designed. "La Crosse" made in widths up to 30", others to 48". Available with extra features—punching, stitching, endless—if desired.

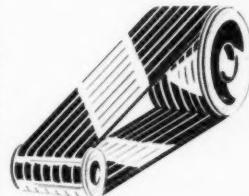


#### "POWER KING" TRANSMISSION BELTING

Friction surface, raw edge construction, especially built for most severe service. Minimum stretch and firm contact with pulleys at high speeds. Highest quality skim friction between plies. 35 oz. silver duck.

#### "POWER KING" High-Capacity V-BELTS

Built with larger, stronger, endless twin grommets to transmit greater H.P. This means fewer belts per drive, reduction in over-all weight, and less space required for any given load. The only high-capacity belts with so little stretch that the efficiency of the drive is not affected. Greater flexibility gives "Power-King" V-belts one-third more gripping power than other types . . . they pull heavier loads.



★ ★ ★

#### PUMP DIAPHRAGMS

#### PUMP VALVES

#### PISTON PACKING

#### ASBESTOS PACKING

#### Liquid Corrosion-Resistant Linings

RUBBER SHEET PACKING  
RUBBER & DUCK PACKING  
CHUTE LINING  
HOSE COUPLINGS, CLAMPS

## GOODALL WATERPROOF FOOTWEAR and CLOTHING

Famous for Quality, Comfort and Long Wear

#### "TOE-SAVER" ® BOOTS

Smooth, tough, flexible jet black rubber, heavy duck lined. Cushion insole. White cap over reinforced steel toe tested to withstand 2,000 lbs. pressure. Tire-tread soles. Hip, Style MB-346. Storm King, Style MB780. Short, Style MB946.

**"WEAR KING" ® BOOTS**—Identical in quality with above, but without "Toe-Saver." Hip, Style MB345. Storm King, Style MB799. Short, Style MB945.

**"RUBBERHIDE" SAFETY INNERSOLES.** Sheet of high-tensile spring steel bonded between layer of top grade sole leather and layer of rubberized canvas duck. Puncture-proof.



**MINER'S PACS** Top quality black rubber. Lace Pacs, Style ML-975, 16" high; Style ML-760, 15" high. Cushion insole. Cleated outsole. "Toe-Saver" Safety Toe. Also non-lace "Terra Haute" pacs, Style ML-271, in otherwise same construction. Other boots, workshoes, arctics and rubbers, built for extra wear and comfort.

#### COATS, JACKETS, OVERALLS

Items too numerous to describe here, in rubber, oiled and latex . . . all designed to afford maximum protection plus comfort in every kind of work. Style 338 coat is a long-time favorite . . . double back; corduroy-lined collar; length 49".



#### SAFETY HATS

"Hardboiled" Safety Hats in fibre glass and aluminum. Easiest to wear, yet providing maximum protection. Also, miners' caps, with or without lamp brackets.



#### TUNNEL SUITS

Style 80 jacket with Style 81 Overall makes the ideal suit for underground work. Other suit combinations to meet every preference or need.

★ ★ ★

Write for catalog describing the complete Goodall clothing and footwear line.



Loading the Tournapull Rear-Dump to capacity, with blasted ore, takes this 2½-cubic yard shovel about 4 minutes. Tournapull's large bowl opening and low rear-entry simplify loading and reduce spillings.

## Mining dolomite for ISCOR

South African Iron and Steel Corporation, Pretoria, Transvaal, South Africa, produces more than 1,465,000 tons of ingot steel annually at its Pretoria and Venderbijlpark steel mills. Daily steel production amounts to better than 4,000 tons.

Every ton of ingot steel produced requires about 800 pounds of high-grade metallurgical dolomite. This mineral is needed as a fluxing agent to convert iron ore into pig iron. At ISCOR's plants, some dolomite is also needed for lining furnace hearths and covering refractory bricks.

### Steel mill operates dolomite pits

To maintain and expand its steel production, ISCOR needs substantial and always dependable supplies of dolomite. In assuring this supply, the Company maintains and operates two quarries of its own.

From one of these pits, south of Pretoria, as much as 2,000 tons of graded metallurgical dolomite is removed in a 16-hour day.

Helping to haul this raw dolomite ore, from the quarry to the crushing plant, is a 22-ton Model C Tournapull Rear-Dump. This machine regularly hauls blasted ore 8/10 mile, in an average of 4½ minutes, over roads with gradients of 1 to 12. Traveling typical 1.6-mile cycles, the Rear-Dump delivers capacity loads of raw ore every 12½ minutes.

### Repair service available

R. Alberts, Chief Mining Engineer at the quarry, notes that the Company's Tournapull "operates satisfactorily" on a 96-hour weekly schedule. He is also pleased because Tournapull parts and service are so readily available in the Transvaal.

LeTourneau-Westinghouse Tournapull Rear-Dumps are built in 3 sizes, with capacities of 11, 22, and 35 tons. May we suggest you write for complete information on these modern high-speed haulers? We shall be pleased to send you an illustrated bulletin and full specifications.

Tournapull—Trademark Reg. U.S. Pat. Off. CR-1806-QJ-1r



At the touch of an electric dashboard switch, the Rear-Dump body lifts, swings low behind rear wheels, to dump its full load into a crusher hopper or over the edge of a bank. This Tournapull can dump a full load of dolomite in about ½ minute. Two-way power control permits slow tilting for spreading load or gradual dumping when desired.



Loaded Rear-Dump starts the haul up 8% grades out of the pit. Tournapulls travel at speeds up to 32 mph, can drive over highways, rough haul roads or across open country. This machine, for example, drove 36 miles from Johannesburg to the quarry south of Pretoria.

You will do more work at less cost with LeTourneau-Westinghouse equipment



**TOURNAPULL REAR-DUMPS:** Available in 3 heavy-duty sizes for dependable off-road hauling. B Rear-Dump carries 35 tons (31.7 met. tons), choice of 300 hp diesel engine with sliding-gear transmission, or 335 hp engine with torque converter. Top forward speed is 30 mph (48.2 kph). C Rear-Dump has 22-ton (20-met.-ton) capacity; 210 hp diesel engine with sliding-gear or constant-mesh transmission. Travel speeds are as high as 32.1 mph (51.6 kph). D Rear-Dump carries 11 tons (10 met. tons). Its engine is rated at 138 hp. Manual transmission is standard. Machine travels at forward speeds to 29.5 mph (47.4 kph).



**TOURNAPULL SCRAPERS:** Scrapers for Tournapull prime-movers are available in 3 sizes: B Full-pak, 27 yd<sup>3</sup> (20.6 m<sup>3</sup>) capacity; C Fullpak, 18 yd<sup>3</sup> (13.7 m<sup>3</sup>); and D Tournapull, 9 yd<sup>3</sup> (6.8 m<sup>3</sup>). These scrapers are interchangeable with Rear-Dump, Bottom-Dump, Flatbed, or lift-and-carry Crane.

## These mining machines will help reduce your operating costs

For the exacting requirements of mining, you need strongly built, dependable machinery. And for minimum costs, you need fast-working machinery as well. Strength, dependability, speed and effective use of power are built into every unit of the LeTourneau-Westinghouse line: Tournapull scrapers, Rear-Dumps, Tournatractors, and Adams model graders.

Check the economical production ability you get with these modern machines. Study the specifications. Ask for complete facts on the type of units which can be used profitably in your operations.



**C TOUNTRACTOR:** This 210 hp, rubber-tired tractor travels anywhere under its own power, at speeds to 17.2 mph (27.6 kph) forward, and to 7.2 mph (11.5 kph) in reverse. Attachments include: dozer blade, Angledozer, root rake, push-block, power-control-unit, winch, side boom, tree stinger, rail coupler, and snow plow. Tournatractor tows sheepfoot rollers, scrapers, rooters and other equipment.



**ADAMS MODEL MOTOR GRADERS:** These are available in seven models, with hp from 60 to 190. Standard models of heavy-duty type have eight forward speeds to 26 mph (41.8 kph), four reverse speeds to 13 mph (20.9 kph). A gear assembly for three extra low speeds is optional. The POWER-Flow 660 has 190 hp engine with torque converter. It has forward speeds to 27.4 mph (44 kph). The LeTourneau-Westinghouse POWER-Flow 550 has 135 hp with torque converter. The handy 60 hp "220" has forward speeds to 18.3, reverse to 3.2 mph. Attachments for grader line include: snow plow, wing, "Snow-Blo" attachment for wing, scarifier, power-shift moldboard, bulldozer, rotary snow plow, and Jebco Elegrader (for sidecasting materials). The LeTourneau-Westinghouse Adams Model TraveLoader picks up windrowed material for casting into trucks. POWER-Flow, Tournapull, Tournatractor, Angledozer, Fullpak—Trademark Reg. U.S. Pat. Off.; Adams—Trademark LA-1796-M-1m



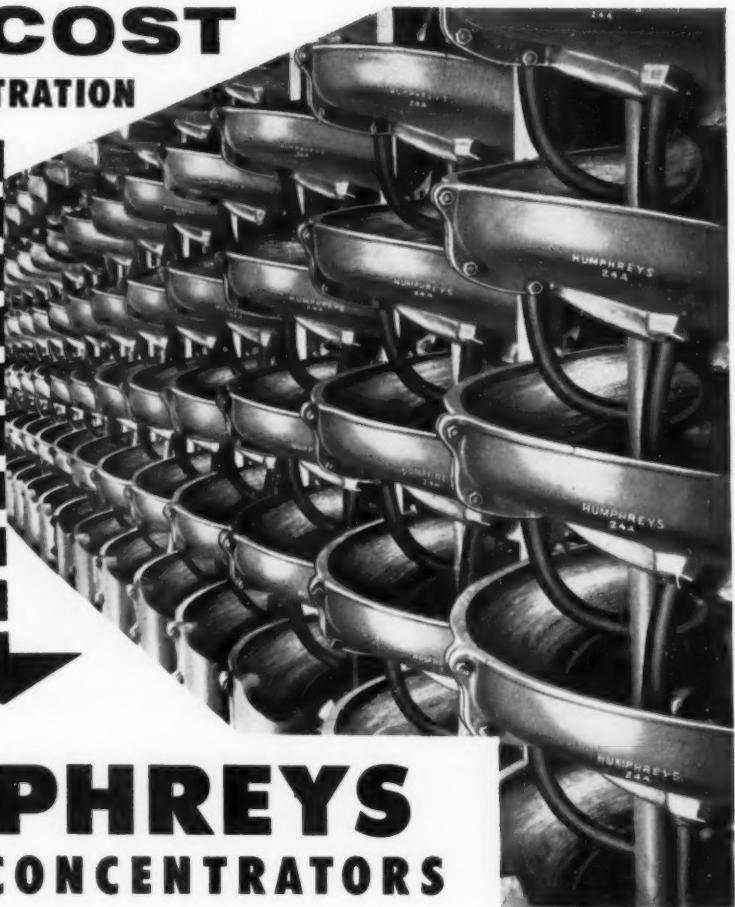
**LETOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS**

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

# LOW COST CONCENTRATION

ANTHRACITE COAL   PHOSPHATE  
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CASSITERITE   PYRITE  
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HEMATITE   TANTALITE  
ILMENITE   URANINITE  
LEPIDOLITE   VERMICULITE  
MAGNETITE   WOLFRAMITE  
MARTITE  
MONAZITE  
MUSCOVITE  
NATIVE COPPER  
ZIRCON



## HUMPHREYS SPIRAL CONCENTRATORS

HAVE ECONOMICALLY RECOVERED THE  
MINERALS LISTED ABOVE

Low cost concentration becomes a reality when you install Humphreys Spirals. Economy-minded mineral producers the world over prize these efficient concentrators, their economical installation, low maintenance costs and year-round trouble-free operation. No moving parts. Small floor space.

### APPLICATIONS:

Production of a finished concentrate.

Production of a bulk concentrate of several minerals and a finished tailing in one or more stages.

Scavenging the tailing from another process for the recovery of heavy minerals.

*Write today for information on metallurgical tests of your ore samples for spiral treatment.*

**HUMPHREYS ENGINEERING COMPANY**  
913 FIRST NATIONAL BANK BLDG. • DENVER 2, COLORADO

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SALA MASKINFABRIKS A-B,  
SALA

SALES AGENT—ENGLAND: THE GENERAL ELECTRIC CO., LTD. (FRASER & CHALMERS ENGINEERING WORKS) ERITH, KENT

# New copper concentrator does all its classification with cyclones



3 model D20B Krebs Cyclones on each mill.

6 model D10B Krebs Cyclones in the regrind circuit.

Pima Mining Company's Arizona plant, starting up in late 1956, is the first U. S. copper concentrator to classify entirely with cyclones.

Pima and nine other U. S. and foreign copper concentrators now have Krebs Cyclones for all or a major part of their tonnage. Operational costs can be substantially lower than with conventional classifiers. Capital cost is about 30%. The metallurgical advantages are usually the primary consideration . . . the flotation engineer may now have an optimum pulp density, and a selective grind of middling grains that reflects in increased concentrate grade as well as lower tailings.

Krebs Cyclone Bulletin 830 describing further cyclone techniques is available on request.



---

**E Q U I P M E N T   E N G I N E E R S   I N C.**

41 SUTTER STREET

SAN FRANCISCO 4, CALIFORNIA

Manufacturers of Krebs Cyclones, Valves and Clarkson Feeders

# **CHRISTENSEN**

## **Diamond Products Equipment**

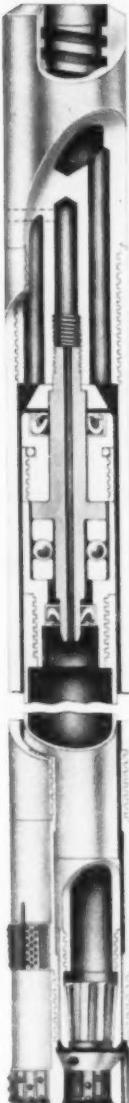
*Engineered to YOUR  
Formation*

**FOR  
ANY  
DIAMOND  
DRILLING  
PROBLEM**

### **FOR HARD, ABRASIVE FORMATIONS**

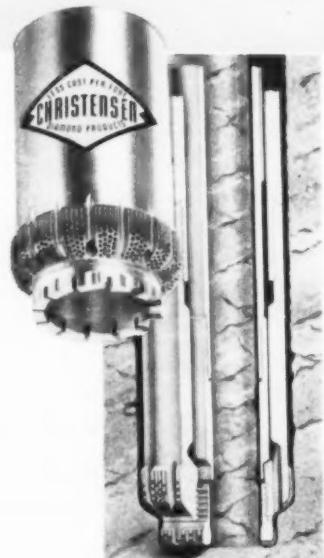
#### *Chrome-Plated Barrel*

Chrome-plating the inside of the inner tube of the Christensen core barrel gives an extremely hard, smooth surface, allowing core to enter freely and reducing to an absolute minimum the tendency of core to wedge and block.



### **FOR SOFT, STICKY FORMATIONS**

Core recovery rates in soft, friable and poorly consolidated formations have been increased greatly by the application of the long-nose pilot bit (shown at right) allowing the driller to core *ahead* of circulation, preventing contact of drilling fluid with the core and alleviating washing problems.



*Pilot section may be set with diamonds or tungsten carbide inserts as illustrated.*



## FOR GENERAL PURPOSE CORING

Standard core bit, used in conjunction with Christensen series C-2 core barrel, has proven very successful in a variety of formations. Remember, each Christensen bit is matched to the formation by varying diamond size, concentration and number of waterways.

## NON-CORING BITS

Variations of concave diamond bits are used profitably for drilling where no core is desired—such as barren rock (to reach pay zones), blast holes, drain holes and grout holes.



## SPECIALTY DIAMOND TOOLS



**Thin-Wall Concrete Bits**—Ideal for recovering concrete cores and for drilling holes in other material when cores are not required.



**Small Diamond Bits and Shells**—These smaller bits and shells have become very popular for short hole prospect drilling. Variety of styles and sizes available.



**Wire Line Diamond Bits**—Step type design results in combination coring-reaming action; helps remove cuttings; gives faster penetration rates, increased stabilization and longer bit life.

## The Christensen Engineer

is on call at any time for advice on any diamond drilling problem. His education and experience qualify him well for on-the-job consultation and to supply the diamond bits and barrels, matched to your formation, that are designed to give the best results under any conditions. Call the Christensen engineer today and operate at "less cost per foot."

*Do you have our latest catalog?  
Write today for SD 507-57*

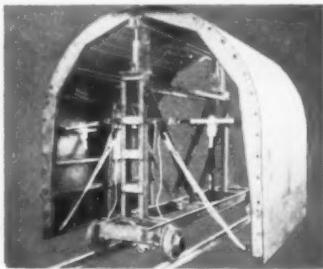
## FREE FILMS

Christensen has available, free of charge, two 16 mm. color and sound films on diamond mining in South Africa and the use of diamond bits in the drilling industry, for showing at association meetings or conventions. Write today for your play-date of these interesting films.

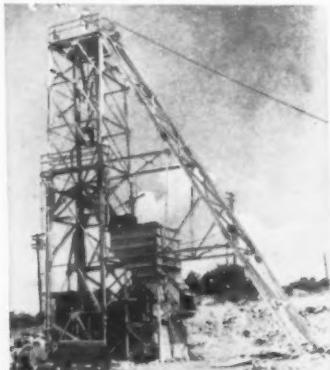
# CHRISTENSEN DIAMOND PRODUCTS



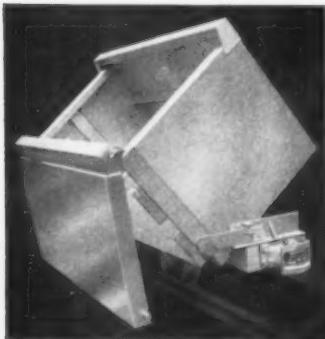
P. O. BOX 387 • SALT LAKE CITY, UTAH



MAYO TELESCOPIC STEEL DRIFT FORM built for the main haulage tunnel, 10' x 11', of an important Pennsylvania iron mine. Other Mayo steel forms, designed for specific jobs in other parts of the world, include: telescopic, non-telescopic, separate sidewall and arch, single unit, full round forms for monolithic pours, etc.



MAYO HEAD FRAMES—for deep or shallow shafts. MAYO SINKING FRAMES—for quick erection and dismantling. Each designed and built for specific installations. Depend on Mayo's world-wide experience to provide the most practical answer to your problem.



MAYO MINE CARS are of several types. Illustrated is a 2½ cu. yd. Side Dump Car, 24" gage of the Granby type. Rocker Dump cars also available. All Mayo cars can be equipped with the Mayo automatic coupler.

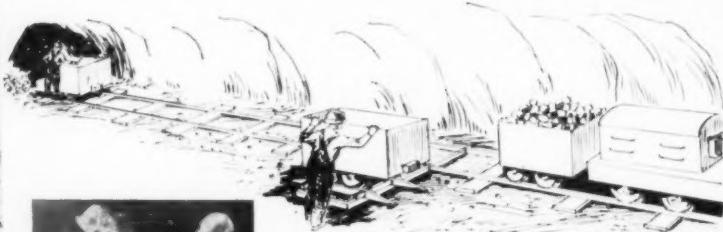


# YOU CAN DEPEND ON **MAYO** TUNNEL and MINE EQUIPMENT

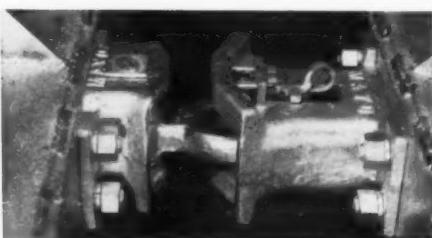
... based on over 25 years of specialized design and construction experience

... proved in use in every part of the world. For more complete information, send for FREE, 8-PAGE BULLETIN NO. 22

## SPECIAL EQUIPMENT DEVELOPED FOR SPECIAL PROBLEMS



MAYO PNEUMATIC GROUTERS have proved dependable, efficient machines for placing low pressure grout in tunnels, mines, shafts and sub-grades. Readily convertible for shooting Pea or Birds-Eye gravel. Always kept in stock for immediate shipment.



... the coupler with the mating instinct  
MAYO AUTOMATIC COUPLERS for Mine Cars couple instantly on tangent or curves. Safe, self-centering link completely eliminates all hazards of hand coupling . . . more than pays for itself by preventing accidents. Easily bolted to existing cars.



# **MAYO**

TUNNEL and MINE  
EQUIPMENT

LANCASTER, PA., U.S.A.

- Skips and Cages
- Kibbles and Gilleys
- Drill Jumbos
- Air Locks
- Tunnel Shields
- Mine Locomotives



## NEW ECONOMY...with DRAVO-SCHENCK vibrating screens—feeders—conveyors

Through an exclusive agreement, Dravo Corporation is now licensed to manufacture vibro-conveyor equipment based on the original designs developed and patented by the Carl Schenck Company of Darmstadt, Germany.

Employing a unique mechanically operated "Micro Thrust" exciter unit, these units provide trouble free operation and low maintenance costs. Dravo-Schenck screens, feeders and conveyors have a wide variety of applications in the handling of ferrous and non-ferrous

ores, sinter, chemicals, cement clinker, crushed stone, coal, abrasive or other difficult-to-handle material. Also available is a helical type conveyor which operates vertically in a space saving spiral and handles bulk material up to four inches in diameter.

Our engineers will be glad to confer with you on specific problems. Complete information on this equipment is available. Write for Bulletin No. 1475, Dravo Corporation, Pittsburgh 22, Pennsylvania.

**DRAVO**  
CORPORATION



Blast furnace blowers • boiler and power plants • bridge sub-structures • cab conditioners • docks and unloaders • dredging • fabricated piping foundations • gantry and floating cranes • gas and oil pumping stations • locks and dams • ore and coal bridges • process equipment • pumphouses and intakes • river sand and gravel • sintering plants • slopes, shafts, tunnels • space heaters • steel grating • towboats, barges, river transportation

# NORDBERG MACHINERY

...engineered for  
large volume, quality  
production of ores and  
industrial minerals

The entire line of heavy-duty Nordberg Mining Machinery has been engineered and built for one basic purpose . . . to meet the mining industry's expanding demand for low cost, quality production and processing of large tonnages of metallic and non-metallic ores and industrial minerals.

The many years of specialized experience gained by Nordberg in working closely with the mining fraternity has resulted in continual design and operational improvements which have consistently made Nordberg Machinery first choice among the world's leading ore and mineral producers.

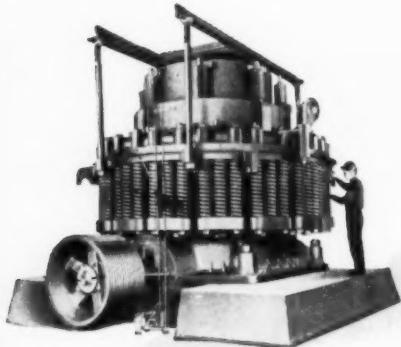
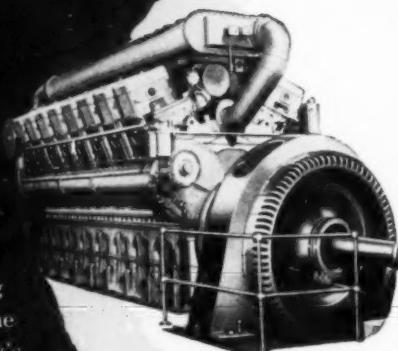
As illustrated, Nordberg Mining Machinery includes Symons® Gyratory Crushers for primary breaking, Symons Cone Crushers for secondary and tertiary crushing, Nordberg Mills for wet or dry grinding, Symons Vibrating Grizzlies and Screens for scalping and sizing, and Nordberg Engines for mine and mill power.

*Write for literature on the Nordberg Machinery you need to efficiently produce large tonnages of ores and industrial minerals at lower cost per ton.*

SYMONS A Registered Nordberg  
Trademark known throughout the world

**NORDBERG MFG. CO.**

Milwaukee, Wisconsin



#### SYMONS CONE CRUSHERS

Built in both Standard and Short Head types, in sizes from 22" to 7' in diameter, in capacities from 6 to 900 or more tons per hour.

#### NORDBERG ENGINES

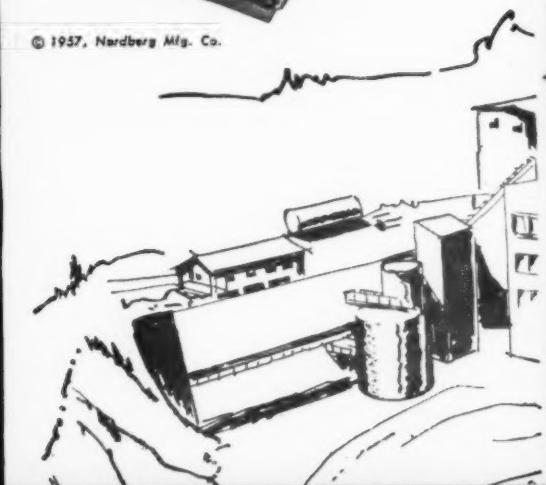
Ranging from small power units to large stationary engines. Nordberg engines are built in types for Diesel, Duafuel® and Spark-Ignition Gas operation, in sizes to over 12,000 horsepower.

#### SYMONS ROD DECK SCREENS

Highly efficient screening surface of spring steel rods—easily replaced. Especially suited for wet, sticky materials.



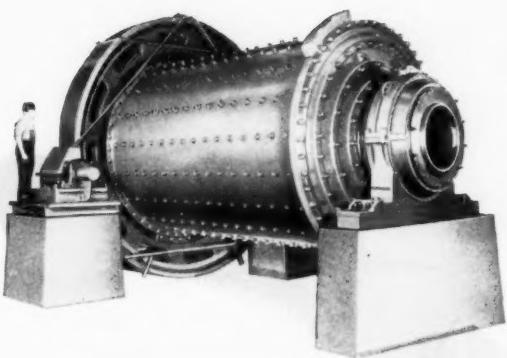
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#### SYMONS® PRIMARY GYRATORY CRUSHERS

Built in 30", 42", 48", 54", 60" and 72" feed opening sizes, for capacities to 3500 or more tons per hour.

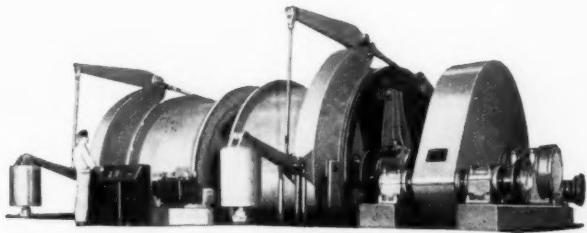


#### NORDBERG GRINDING MILLS

Built for wet or dry, open or closed circuit operation . . . including Rod, Ball, Pebble, Tube and Compartment types, in sizes from 6' to 13' dia., up to 50' in length.

#### NORDBERG MINE HOISTS

Built in both friction and drum types for hoisting both ore and men. These dependable hoists are widely used in large coal and metal mining operations.

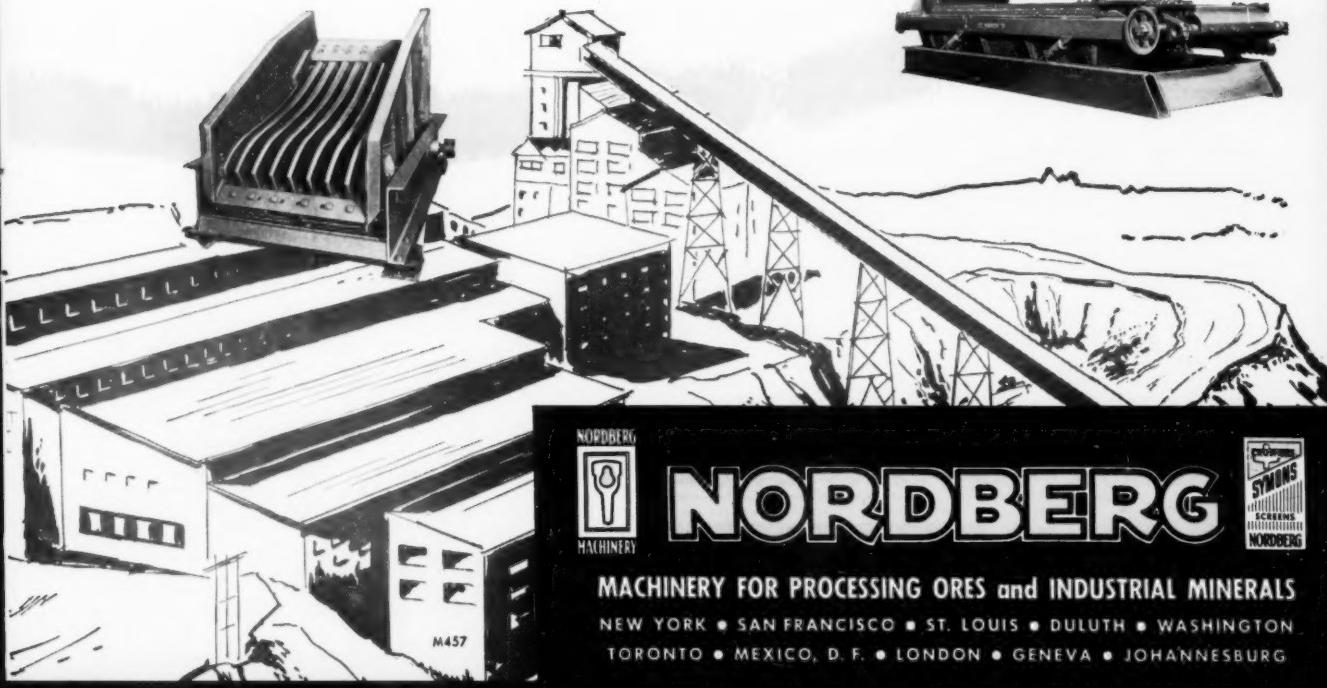


#### SYMONS VIBRATING BAR GRIZZLIES

Built for heavy duty large capacity primary scalping service. Particularly effective when handling wet, sticky or gummy ores.

#### SYMONS HORIZONTAL VIBRATING SCREENS

Permit level, large capacity screening of extreme accuracy. Built in single, double and triple deck types in a wide range of widths and lengths.



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for faster,  
more efficient drilling  
in harder formations



## THE NEW "BLUE DEMON" THREE CONE ROCK BITS IN THE MOST POPULAR DRILLING SIZES

**3 $\frac{7}{8}$ " through 5 $\frac{5}{8}$ "**

The Hawthorne "Blue Demon" Cone-Type Rock Bit is a high quality, precision made rotary bit for minerals exploration and mining and quarry blast hole drilling.

Available in four formation types, in popular sizes from 3 $\frac{7}{8}$ " through 5 $\frac{5}{8}$ ", these three-cone bits are manufactured from high-hardness steel alloy, which has superior wear-resistant properties after heat-treating. Head sections and cone bearings are uniformly machined on Hawthorne's high-precision automatic equipment, with roller and bearing faces machined and ground perfectly concentric.

A special hard-facing process bonds a combination of tungsten carbides and other high abrasive resistant alloys, of exceptional hardness, to the cutter surfaces, for exceptional cutting speed and long bit life.

For complete details about the Hawthorne "Blue Demon" Cone-Type Bits, and the "Blue Demon" line of Replaceable Blade Exploration Bits, write for illustrated Catalog 658.

### PRICE LIST — HAWTHORNE "BLUE DEMON" THREE-CONE ROCK BITS

Bit Size (in.)	Pin Size API Reg. (in.)	TYPES RECOMMENDED				
		For Medium Formations	For Medium- Hard Formations	For Harder Non- Abrasive Formations	For Extremely Hard, Abrasive Formations	Approx. Net Weight (lbs.)
3 $\frac{7}{8}$	2 $\frac{1}{2}$	BD-MA or W	BD-MHA or W	BD-HA or W		8 \$ 52.50
4 $\frac{1}{4}$	2 $\frac{1}{2}$	BD-MA or W	BD-MHA or W	BD-HA or W		9 52.50
4 $\frac{1}{2}$	2 $\frac{1}{2}$	BD-MA or W	BD-MHA or W	BD-HA or W		10 55.00
4 $\frac{3}{4}$	2 $\frac{7}{8}$	BD-MA or W	BD-MHA or W	BD-HA or W		12 60.00
5 $\frac{5}{8}$	3 $\frac{1}{2}$				BD-AHA or W	65.00
						20 98.00
					BD-AHA or W	103.00

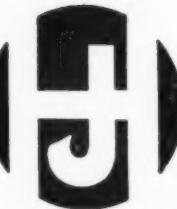
FOOTNOTE: A and W references are types for air or water drilling. Specify type desired when ordering. \*Prices slightly higher in Canada and Alaska.

**HERB J. HAWTHORNE**

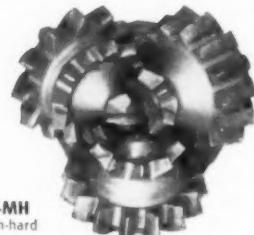
**INC.**

P. O. Box 7366 • Houston 8, Texas • Cable Address: HAWBIT

**TYPE BD-M**  
for medium  
formations



**TYPE BD-MH**  
for medium-hard  
formations



**TYPE BD-H**  
for harder  
non-abrasive  
formations

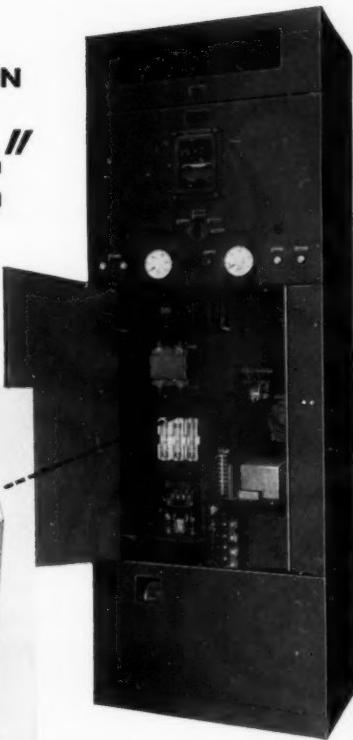
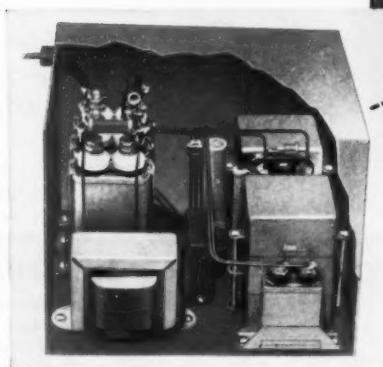


**TYPE BD-AH**  
for extremely  
hard, abrasive  
formations



THE WESTERN PRECIPITATION

# "Transistomatic" CONTROL



*BY FAR,  
the  
Industry's  
Most  
Advanced  
Precipitator  
Control...*

## NO TUBES! NO RELAYS! NO COUNTERS!

and carries a *Lifetime Guarantee!*

In the electrostatic precipitation of dust, fume and fly ash, no installation is completely modern without automatic control to maintain optimum Precipitator efficiency as the characteristics of the gas stream fluctuate. Compared with manual control, automatic control is not only more sensitive and more efficient, but actually costs less because of the vital savings it makes in labor and operating costs . . . *savings so important that no profit-minded operator will want to be without them.*

### But the important point to remember is this—

Although many manufacturers of precipitation equipment offer units for precipitator automation, no other unit is equal to the "Transistomatic" Control for foolproof simplicity, rugged dependability or control accuracy!

*These are not idle claims. They can be easily verified by making your own comparison . . .*



#### A DESCRIPTIVE BOOKLET

*that gives further information will gladly be sent on request. Write, wire or phone our nearest office!*

*Compare ACCURACY!* The "Transistomatic" does not base its "sensing" action on spark frequency alone—or spark intensity alone. Instead, it continuously integrates BOTH frequency and intensity to establish an overall "power value" that provides a new standard of control accuracy!

*Compare DEPENDABILITY!* The "Transistomatic" unit contains no parts of any kind requiring regular replacement. Moreover, the entire unit is completely sealed—moisture-proof and watertight.

*Compare GUARANTEES!* The "Transistomatic" is so foolproof and trouble-free it carries a lifetime guarantee!

**BEFORE YOU BUY ANY** automatic precipitator control, be sure to get the complete "Transistomatic" story. A folder is available giving additional data. Or see your nearest Western Precipitation representative for further details!



WESTERN  
**PRECIPITATION**  
CORPORATION

Engineers and Constructors of Equipment for Collection of Suspended Material from Gases . . . and Equipment for the Process Industries  
LOS ANGELES 54 • NEW YORK 17 • CHICAGO 2 • PITTSBURGH 22 • ATLANTA 5 • SAN FRANCISCO 4

*Representatives in all principal cities*

Precipitation Company of Canada Ltd., Dominion Square Bldg., Montreal

# Graybar...

## A complete electrical supply service for mining and refining

Electrical equipment and supplies to meet the special needs of the mining industry are an important part of Graybar's all-inclusive service. Located at or near leading mining centers, Graybar offices and warehouses serve as prompt local supply sources for the

products of over 300 leading manufacturers. Graybar Representatives in these areas are well informed on underground or above-ground service requirements. Specialists on wiring, lighting, communication, and power apparatus are ready to help you.

430

### ELECTRIC CABLE

GRAYBAR offers a complete line of wire and cable for power distribution, for mining machinery and locomotives, shot firing, signaling, and other specialized needs.



Simplex mining machine cable has tough outer selenium-neoprene armor to stand up in mining service.



Tirex shot-firing cable combines flexibility and light weight with high strength.



Graybar offices and warehouses are located in over 130 principal cities — there's sure to be one near you!

### MOTORS, CONTROLS, FANS

General Electric motors and controls, meeting Bureau of Mines or Underwriters Laboratories requirements for hazardous areas, are available via GRAYBAR as a part of our power apparatus service. Ilg ventilating fans and blowers of all types are also available for mine use.



### MINE TELEPHONES

U.S.I. Mine Telephones are sound-powered . . . require no batteries or external power supply. They transmit speech clearly over lines of any length. Supplied for either code or selective signaling up to 24 stations. U.S.I. Mine Telephones carry Bureau of Mines Approval No. 905.



### TAPE AND WIRING SUPPLIES

GRAYBAR "Victor" tape is a widely used favorite. Weatherproof sockets, fuses, circuit breakers, panel boards, switches, and terminals are among the many additional wiring supplies distributed by Graybar for electrical systems above ground or below.



### LIGHTING EQUIPMENT

Lamps and lighting equipment offered via GRAYBAR include explosion-proof, vaporproof and other specially protected types. Also a full line of floodlights for outdoor service, fluorescents for offices and drafting rooms. Our portables and flashlights are listed by Underwriters Laboratories for Class I, Group D conditions.

# Graybar

ELECTRIC CO., INC.

420 Lexington Avenue, New York 17, N. Y.



Showed dumping its big pay load of iron ore at a loading platform in Venezuela, this 802-B is one of a fleet of Kenworth rock and ore movers operated at Orinoco Mining Company concessions.



## 48-Ton Kenworth 802-B's Haul Iron Ore in Venezuela

From the crests of southeastern Venezuela's hills and ridges, giant Kenworth Model 802-B's are moving tons of high-grade iron ore for the Orinoco Mining Company, a subsidiary of United States Steel Corporation.

Hauling from Orinoco Mining Company's Altamira-Rondon-Arimagua mining concessions, they carry ore to an ore-gathering system loading platform for subsequent shipment to Puerto Ordaz. Equipment to mine and haul approximately 500,000 metric tons of ore a year is assigned to the Altamira-Rondon and Altamira-Arimagua production.

The mines are only part of a massive project which spans years of development work by the Orinoco firm. Its activities have included the construction of roads, docks, airfields and a railroad; the dredging of a deep-water channel to the sea; and the construction of two complete model communities—Puerto Ordaz and Ciudad Piar.



Typical of the rugged Kenworths in action in Venezuela, this 802-B is equipped with power steering and oversized brakes.

The company's Kenworths are built on a big scale, too—48-ton units with a struck capacity of 32 cubic yards each. For extra-strength, their rigid, variable-section frames are 15½ inches deep at the point of greatest loaded stress. Channel side members are machine welded of carbon steel plate. Axles, too, are engineered for over-capacity. Dump bodies, of Cor-ten and Man-ten steel alloys, have double construction with

steel channels welded between wrap-sheets and lining-plates.

Built to move in and out of tight corners, these spring-mounted semi's combine wide-track axles with comparatively short tractor wheelbases of 168

The Kenworth 802-B has a dumping angle of 60 degrees. Its dumping action moves the tractor backward and under the trailer while the front of the trailer raises. Kenworth-patented, telescopic hoists are fast-acting, two-cylinder, straddle-mounted with single-lever, three-position controls. Rugged pin-type construction of the fifth wheel provides stability in dumping and in over-the-road hauling.

Each Kenworth in service for Orinoco Mining Company is powered with a 335-horsepower diesel engine, has a torque convertor and three-speed torque-matic transmission with hydraulic braking, air starter, nickel-cadmium batteries and tubeless tires.



# KENWORTH

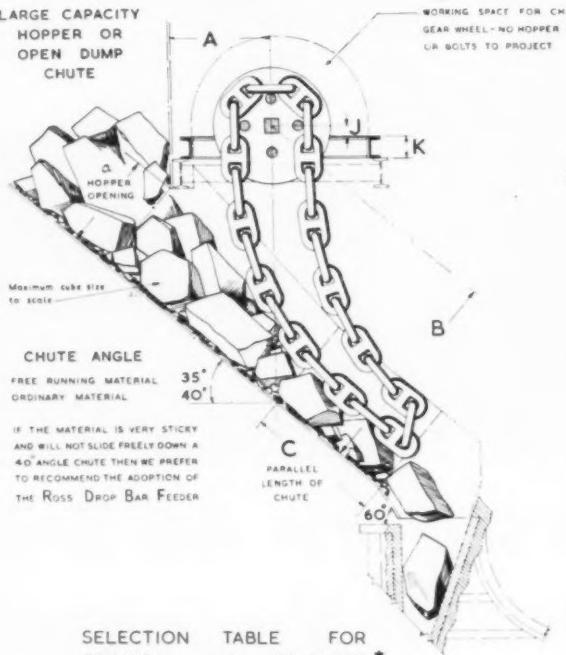
MOTOR TRUCKS

HOME OFFICE: SEATTLE 24, U.S.A.; FACTORIES AT SEATTLE AND VANCOUVER, B.C.

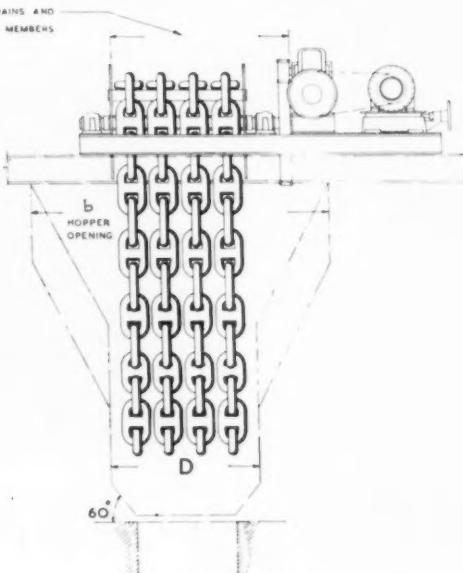
DISTRIBUTORS IN THE UNITED STATES AND MANY FOREIGN COUNTRIES

# NEW DESIGN OF ROSS PATENT CHAIN FEEDERS

LARGE CAPACITY  
HOPPER OR  
OPEN DUMP  
CHUTE



WORKING SPACE FOR CHAINS AND  
GEAR WHEELS NO HOPPER MEMBERS  
OR BOLTS TO PROJECT



SELECTION TABLE FOR  
PRIMARY JAW CRUSHERS \*

FEEDER SIZE	DIMENSIONS IN INCHES				WEIGHT IN CWTS	SCALE
	MAXIMUM PIECES CUBE	CRUSHER MOUTH SELECT NEAREST STANDARD SIZE	HOPPER OPENING a, b			
3 W	9	9.13-18	18-12	18	54	23 1/30
4 W	12	12-18.24	24-16	24	72	48 1/40
5 W	15	15-22.30	30-20	30	90	85 1/50
6 W	18	18-27.36	36-24	36	108	140 1/60
7 W	21	21-32.42	42-28	42	126	220 1/70
8 W	24	24-36.48	48-32	48	144	325 1/80
9 W	27	27-40.54	54-36	54	162	450 1/90
II V	33	33x50x66	66x44			

\* THIS TABLE IS A GUIDE TO JAW CRUSHER INSTALLATIONS. OTHER FEEDING  
DUTIES TO WHICH THE ROSS CHAIN FEEDER IS APPLICABLE ARE:-  
GYRATORY CRUSHERS HAMMER MILLS ROPEWAYS  
CONE CRUSHERS CONVEYORS SKIPS, WAGONS  
ROLL CRUSHERS SCREENS AND MINE CARS  
REFER DETAILS OF DUTY TO OUR ENGINEERING DEPT. FOR  
RECOMMENDATIONS

FEEDER SIZE	DIMENSIONS IN INCHES										
	A	B	C	D	E	F	G	H	J	K	L
3 W	19	39	24	27	17	19	18	60	2 $\frac{1}{2}$	4.2	22 $\frac{1}{2}$
4 W	24	51	32	36	22	26	24	64	3	5.2 $\frac{1}{2}$	30
5 W	30	63	40	45	28	32	30	80	3 $\frac{1}{2}$	6.3	37 $\frac{1}{2}$
6 W	36	75	48	54	33	39	36	96	3 $\frac{1}{4}$	7.3	45
7 W	42	87	56	63	39	45	42	112	4 $\frac{1}{4}$	8.3	52 $\frac{1}{2}$
8 W	48	99	64	72	44	52	48	128	5	9.3 $\frac{1}{2}$	60
9 W	54	111	72	81	50	58	54	144	5 $\frac{1}{4}$	10.3 $\frac{1}{2}$	67 $\frac{1}{2}$

OTHER "ROSS" UNITS: ROSS DROP BAR GRIZZLY FEEDER  
ROSS TWO-ROLL GRIZZLY

ROSS SCREEN & FEEDER CO.  
100 QUIMBY STREET  
WESTFIELD, N.J., U.S.A.

ROSS ENGINEERS LTD.  
11 WALPOLE ROAD  
SURBITON, SURREY, ENGLAND

CANADIAN LICENSEE: DORR-OLIVER-LONG, LTD., ORILLIA, ONTARIO



Skip bucket liners of USS "T-1" Steel cut dead weight, last longer, cost less to replace than the liners previously used.



## "T-1" Steel doubles the life of skip bucket liners

—reduces weight by  $\frac{1}{2}$  ton



Skip hoist at Miami Copper Company Mine, Miami, Arizona, hauls abrasive copper ore up a 1080-foot shaft, making 80 trips per hour.

This skip hoist at the Miami Copper Company Mine, Miami, Arizona, has two skip buckets which weighed 19,350 pounds each. The old liners, made of structural carbon steel, consisted of 1-inch-thick bars riveted to  $\frac{3}{8}$ -inch-thick plates. By replacing this arrangement with  $\frac{1}{2}$ -inch-thick plates of USS "T-1" Steel, weight was reduced by almost half a ton.

The present USS "T-1" Steel front dumping-lip liner and the side liners last more than twice as long as the previous liners. What's more, fabrication costs for a complete lining have been reduced by more than 90%, and replacement time cut to a fraction.

*USS and "T-1" are registered trademarks*

What USS "T-1" Steel can do for you. This versatile steel has a combination of properties unexcelled for mining equipment. It has nearly 3 times the yield strength of structural carbon steel, outstanding resistance to impact abrasion, exceptional toughness, even at temperatures as low as  $-50^{\circ}\text{F}.$ , and is readily weldable without preheating.

This means you can get rid of dead weight and lower your costs by using USS "T-1" Steel for dippers, sticks, booms, chutes, hoppers, cars, and other equipment. Write for our booklet, "Mining's Metal, USS 'T-1' Steel." United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.



## United States Steel

United States Steel Corporation — Pittsburgh  
Columbia-Geneva Steel — San Francisco  
Tennessee Coal & Iron — Fairfield, Alabama  
United States Steel Supply — Warehouse Distributors  
United States Steel Export Company

This impressive installation at Kiruna, Sweden, demonstrates a major benefit of ASEA Multi-Rope Friction Hoists: *low initial installation cost.*

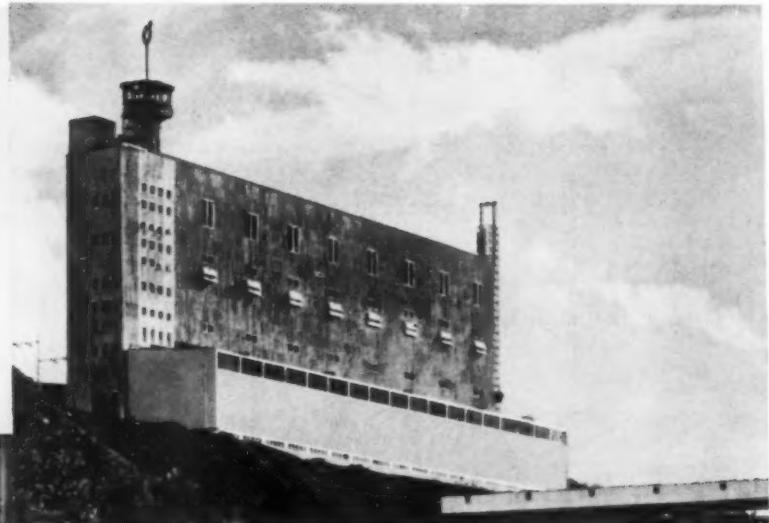
Each of these ASEA Hoists has a skipload of 22 tons and is designed for a depth of 1500 feet, maximum speed 2200 feet per minute.

At Kiruna, as in mining operations throughout the world, ASEA Multi-Rope Hoists prove less costly to operate, safer, and they reduce rope wear.

In the U.S. these advantages may be seen in the ASEA installations of National Potash Co. and Cleveland Cliffs Iron Ore Co.

# 9 HOISTS IN ONE HEAD FRAME

**Total capacity:**  
**4600 tons**  
**per hour**



**FULLY AUTOMATIC**, the ASEA Hoists at Kiruna eliminate the employment of hoist men. At U.S. wage rates, assuming two-shift operation, this would mean a saving of about \$30,000 yearly for each hoist!

*Write for illustrated literature on ASEA Multi-Rope Friction-Drive Mine Hoists.*

## ASEA

*World pioneer in electrical products for industry*

U. S. Sales  
and Service:

## ASEA ELECTRIC, INC.

formerly AROS ELECTRIC, INC.  
500 FIFTH AVENUE, NEW YORK 36, N.Y.

# SLURRY CONTROL



## BENDIX NUCLEAR DENSITY GAGE AUTOMATICALLY CONTROLS SP. GR.<sup>†</sup> OF FEED SLURRIES

<sup>†</sup>Specific Gravity

The fluid content of your slurry can mean the difference between profitable optimum control and costly borderline operation. Down time due to pump failures can be drastically reduced and plugged equipment can be virtually eliminated with the Bendix<sup>\*</sup> Nuclear Density Gage. In processes using kilns to remove water, fuel savings can be realized; where efficient recovery of solids from flue gas or optimum ore separation by Specific Gravity is desired, the Gage can be readily adapted.

Bendix Nuclear Density Gage assures successful processing in metals mining and non-metals mining operations. Control of the fluid or solids content of your slurry can be maintained precisely at any desired point. The measuring element does not contact the slurry, therefore abrasive and corrosive processes can be handled with ease. Control is continuous and automatic.

A complete and accurate record of Specific Gravity is provided as rapidly as the process changes occur. Inadequate sampling techniques and "post mortem" laboratory analyses need no longer be tolerated.

• Applications: Wet slurries in ball mills, rod mills, flue gas recovery systems, dust collectors, flotation, classifiers, thickeners, etc.

Bendix furnishes consulting service for every installation. Write for full details to Cincinnati Division, Dept. 420, 3130 Wasson Road, Cincinnati 8, Ohio.

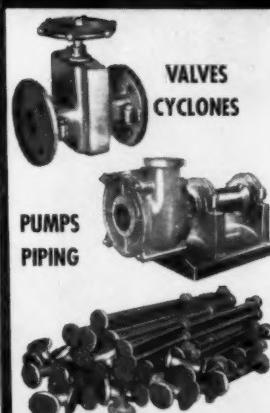
\*TRADEMARK

Export Sales: Bendix International, 205 E. 42nd St., N. Y. 17, N. Y.  
Canada: Computing Devices of Canada, Ltd., Box 508, Ottawa 4, Ont.

Cincinnati Division



**INATEX**  
LASTS LONGEST



*Liner*  
WITH  
**LINATEX**

(a specially processed rubber)  
the most effective way  
to combat abrasion

CHUTES — LAUNDERS  
HOPPERS — SKIPS  
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CONVEYOR BELTS

Write for free information

**LINATEX CORP. OF AMERICA**

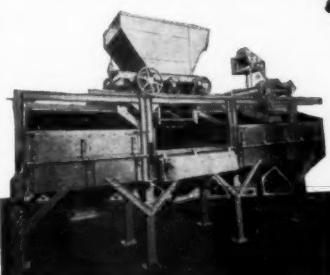
P.O. DRAWER "D", STAFFORD SPRINGS, CONN.

## Smelting on Site

with  
**MACE Furnaces**  
and  
**Sintering Hearths**

Saves high transportation and treatment charges on your ores and concentrates.

Write or wire for new catalog.



Standard sizes 5 to 250 tons capacity. Working scale tests on ton lots or larger made at our Denver smelter. Send us an analysis for preliminary report.

**The Mace Company**

FIRE CONCENTRATION METALLURGISTS

2763 Blake Street, Denver 5, Colo., U.S.A.

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# KEEP OPERATING COSTS DOWN

WITH

## GYROSET

### VIBRATING SCREENS TOP PRODUCTION

AND

### GREATER EFFICIENCY

WHEN

## SIZING

AND

## DEWATERING

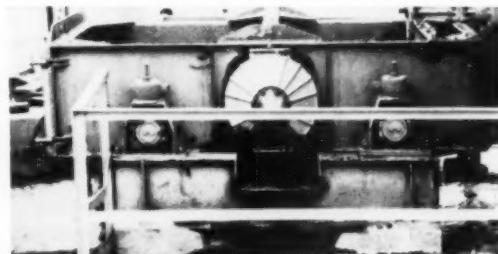


To insure top sizing performance at minimum costs experienced mining operators specify GYROSET SCREENS.

GYROSET Screens can effectively scalp, size or de-water. Due to their adjustable action and their ability to operate at high speed and with any degree of pitch GYROSET Screens will work at a higher capacity than any other screening unit. With positive action GYROSETS can handle dry or wet sizing of ores in a wide variety of sizes at maximum capacity and efficiency.

#### POSITIVE ECCENTRIC ACTION POSITIVE STROKE ADJUSTMENT with only 2 bearings

The positive eccentric action of GYROSET Screens gives a full circle throw over the entire length and breadth of the screen surface. With a two-bearing action, movement is achieved with the fewest moving parts.



Construction is simple and rugged. One to Three decks. 18" to 72" in width—4' to 16' in length. Dust tight units available.

**THERE IS A GYROSET SCREEN FOR EVERY ORE PROCESSING OPERATION**

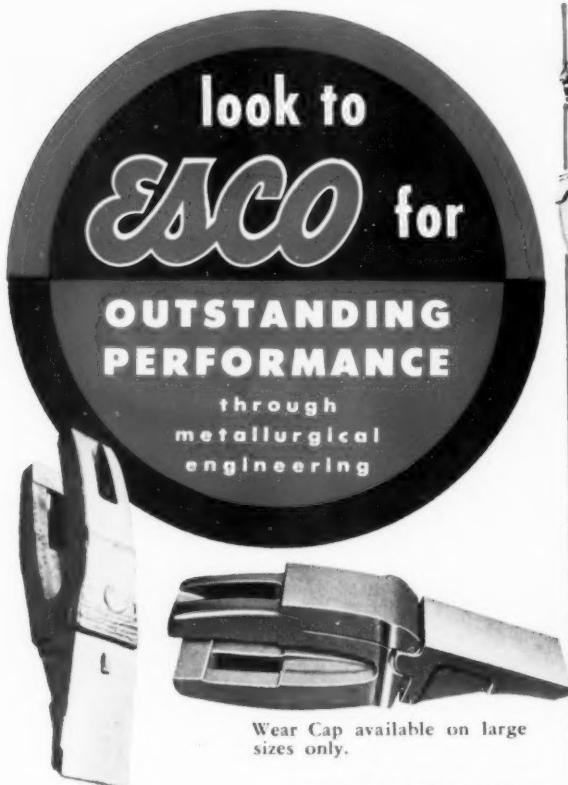
Write us for full details and complete specifications

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## PRODUCTIVE EQUIPMENT CORP.

2926-28 West Lake Street

Chicago 12, Illinois



Wear Cap available on large sizes only.

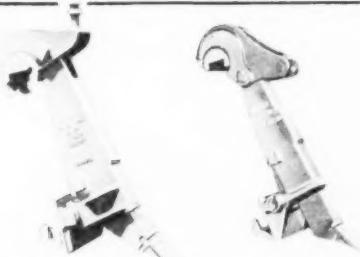
### **ESCO** 12 M Tested Points and Wear Caps More

Than Double Performance Life.

Cast of **ESCO** 12 M, **ESCO** Tested Points and Adapters are metallurgically engineered to the severe conditions of mining operations. **ESCO** Wear Cap Adapters

are now available with replaceable, slip-on Wear Caps for longer Adapter life.

Every **ESCO** Point is Brinell tested before shipment to assure absolutely correct degree of hardness. **ESCO** points start sharp, stay sharp longer. Five **ESCO** Points can be removed and replaced in five minutes, cutting downtime to a minimum.



### **ESCO**

Dozer Rooter® Rips Rock, Hardpan, Cuts Stripping Costs Up To 50%.

An **ESCO** Buck Forte Dozer Rooter outperforms a drawbar ripper, minimizes powder work by ripping through hardpan, rock, coal

and shale. Easily installed by one man on the blade of a straight or angled dozer. Rooting depth is adjustable. An **ESCO** Dozer Rooter is portable enough to carry on the tractor from one area to another. Sizes available to fit any dozer or angle dozer.

**For Details  
See Your ESCO Dealer  
or Write Direct**

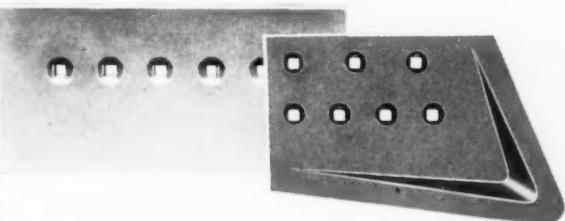


### **ESCO**

Dragline Buckets and Dippers Designed For Greater Payload, Less Maintenance.

**ESCO** builds a complete line of dragline buckets, dippers, backhoes and orange-peels. All critical wear points on **ESCO** buckets are heavy-duty manganese steel castings, highly resistant to shock and abrasion of rug-

ged mining operations. All **ESCO** buckets are metallurgically tailored for extra strength with less weight, and designed for greater payload and sharply reduced maintenance. Special loading dippers or draglines can be built to your specifications. **ESCO** also manufactures a complete line of solid-cast chain and dragline replacement parts.

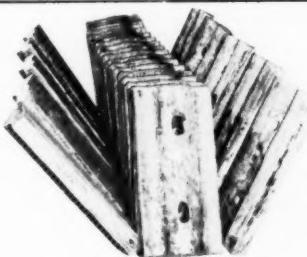


### **ESCO**

Cutting Edges and End Bits Last Longer on Tough Mining Jobs.

The shock and pounding of rough work actually makes the surface of an **ESCO** Cutting Edge more wear

resistant—yet the core retains high impact toughness regardless of age or usage—even in sub-zero temperatures. **ESCO** End Bits stay on the job longer—even in sand and extremely abrasive material—because they are cast of **ESCO** 12 M.



### **ESCO**

Castings For Every Mining Requirement.

**ESCO** can furnish impellers, rabble arms, roaster arms, chute liners, grates, special valves, conveying chain, ball mill liners, mill

hammers or any special castings. **ESCO** has complete foundry facilities for static, centrifugal or shell castings of any size, shape or quantity in a wide range of alloys. Complete application engineering service available if needed.



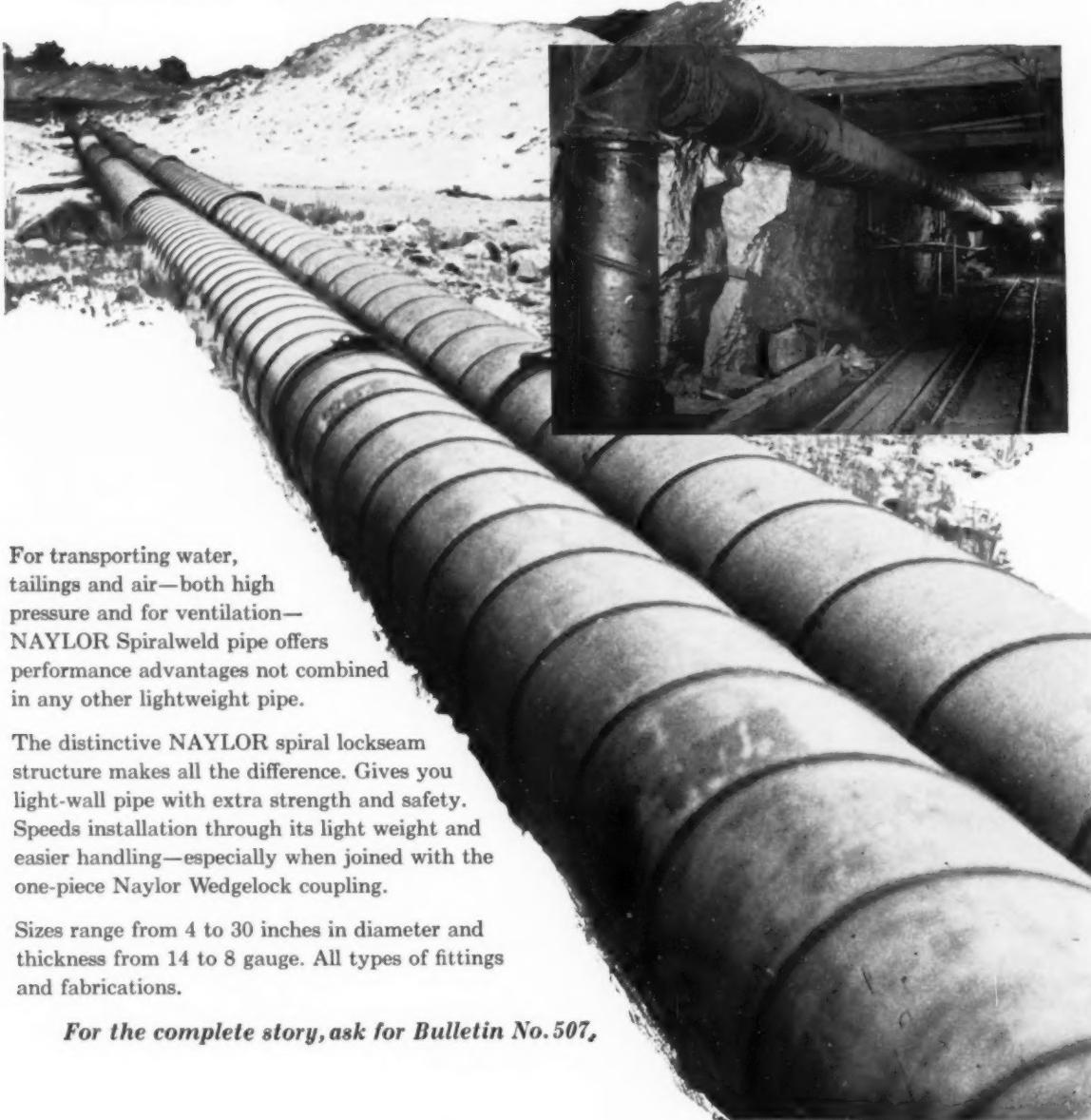
### ELECTRIC STEEL FOUNDRY COMPANY

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MFG. PLANTS AT PORTLAND, ORE. AND DANVILLE, ILL.  
Offices in Most Principal Cities

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# LOW-COST TRANSPORTATION SYSTEM

To Speed Work Above Ground and Underground



For transporting water, tailings and air—both high pressure and for ventilation—NAYLOR Spiralweld pipe offers performance advantages not combined in any other lightweight pipe.

The distinctive NAYLOR spiral lockseam structure makes all the difference. Gives you light-wall pipe with extra strength and safety. Speeds installation through its light weight and easier handling—especially when joined with the one-piece Naylor Wedgelock coupling.

Sizes range from 4 to 30 inches in diameter and thickness from 14 to 8 gauge. All types of fittings and fabrications.

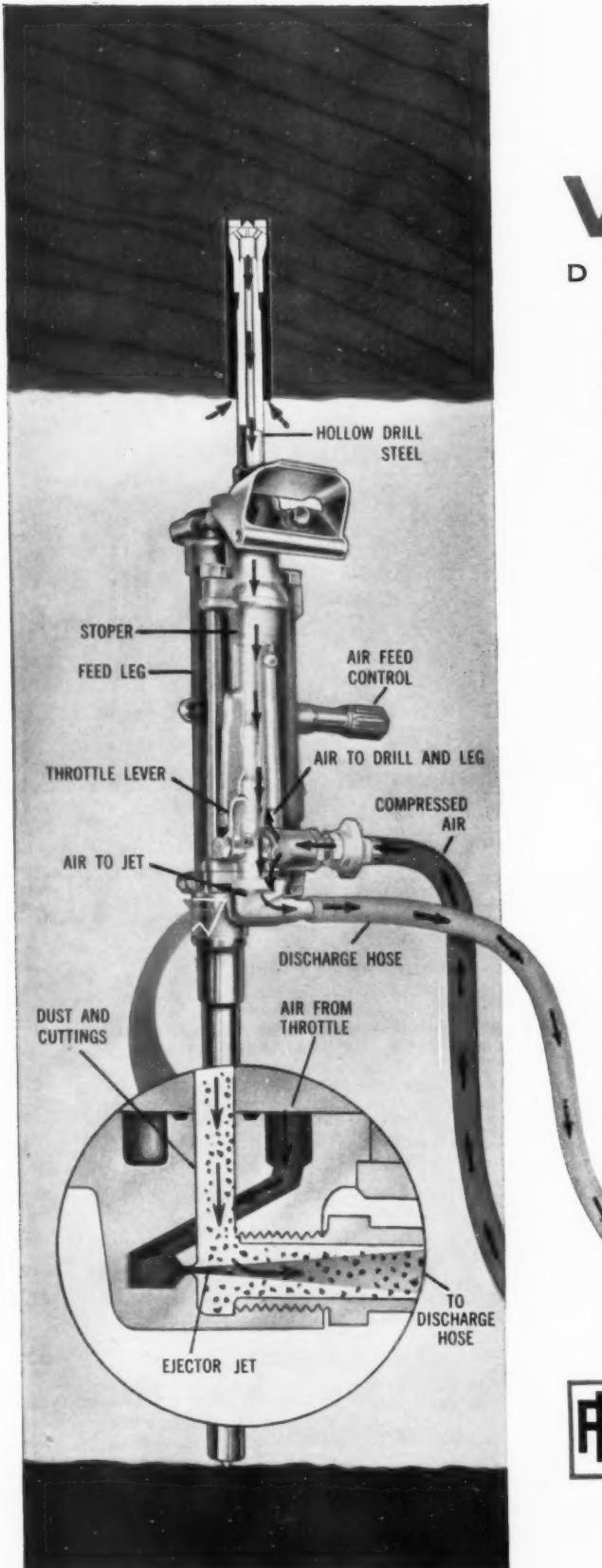
*For the complete story, ask for Bulletin No. 507.*



# NAYLOR

1242 East 92nd Street, Chicago 19, Illinois

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Only the Ingersoll-Rand

# VACUJET

DUSTLESS STOPER

**offers all these  
cost-saving advantages**

**for roof bolting**

Designed from the ground up for dry dustless drilling, with built-in jet vacuum and pressure discharge, the Ingersoll-Rand RP38E VACUJET dustless stoper is setting entirely new standards of performance and economy. Here's why:

**Strongest Suction Power** — vacuum is produced, right in the drill itself — not 25' away. Will even remove cuttings on horizontal holes!

**Dust Discharged Under Pressure** — no costly vacuum hose required. Ordinary 1" air hose carries dust up to 25 ft. away from drill.

**Low-Cost Dust Collector** — a simple filter and receptacle is all that's required. Even a canvas bag will do.

**Quieter Operation** — there is no unnecessary ear-splitting whine or howl in the dust collection system.

**Highest Drilling Speed** — because stronger suction and ample ports assure non-clogging operation.

**Lower Bit-Shop Costs** — tapered bit end and plain shanked drill steels eliminate need for furnaces, threading and forging equipment.

*There's no other stoper like it!*

For complete information, send today  
for a copy of Bulletin No. 4195.



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COMPRESSORS • CARSET BITS • ALLOY RODS • HYDRA-BOOM JUMBOS  
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## DU PONT ANNOUNCES... Royalties slashed 50% on AKREMITE\*

**Now—save more money than ever before with this low-cost blasting agent**

Designed and carefully compounded to give high energy, greater safety, easy loading, uniformly reliable results. Here's how to trim your overall costs to the bone.

Use the Akremite blasting method, designed for large-diameter holes in medium-hard material. You can make your own Akremite by a simple process (under sub-licensing arrangement with Du Pont or other licensed explosives manufacturers) or you can buy Akremite direct.

Either way, you save blasting dollars, because the proven reliability of Akremite makes it the most economical blasting agent you can use—and now the royalties have been cut in half. This also applies to the new improved formulation now available.

You can use Akremite for stripping, open-pit mining, or other large diameter shooting. Besides saving

money, it offers you several other advantages:

**High Energy.** Excellent blasting efficiency, as proven by the experience of large bituminous-coal strip pit operators and others under a wide variety of conditions.

**Increased Safety.** Can't be detonated by blasting caps, friction, shock or even standard "Pramacord." Relatively insensitive Nitramite® primers or properly sized dynamite or non-nitroglycerin primers are necessary to do the job.

**Fast, Easy Loading.** Akremite is packaged in moisture-resistant plastic bags which are flexible and conform to the shape of the borehole to give maximum loading density and performance. They are easy to handle, and easy to load.

There's no Nitroglycerin in Akremite, either, so you have no "powder" headaches.

Write us for complete details, or contact any of the companies listed at lower left. E. I. du Pont de Nemours & Co. (Inc.), Explosives Dept., Wilmington 98, Del.

\*Licensed exclusively to the Du Pont Company under the Maumee Collieries Co. Process Patent No. 2,703,528 and presently sublicensed to:

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ATLAS POWDER COMPANY  
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**AKREMITE**  
**BLASTING METHOD**  
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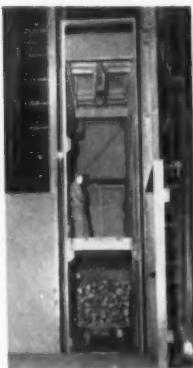


BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

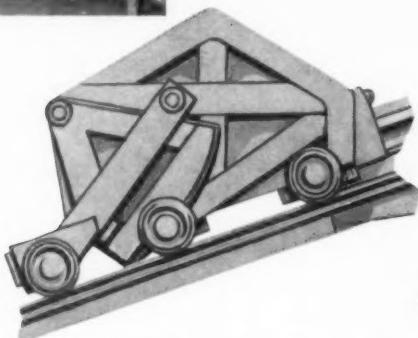
# 7 Ways To Cut Mining Costs

**1**

Lake Shore Idler, Carrying and Head Sheaves are available in many sizes and types. A new fabricated sheave represents the latest in design and construction.

**2**

This double deck 80-man cage is one of many different types of vertical and inclined cages obtainable. Combination skip and cage also available for various requirements.

**3**

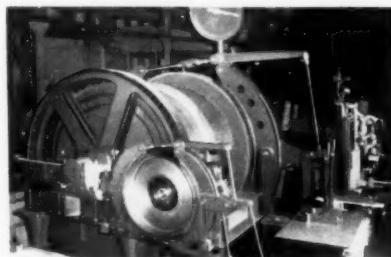
The JETINCLINE Bottom Dump Skip has all the advantages of Lake Shore's famous "Jeto" skip—fast, clean dumping and lasting construction. Available in capacities up to forty-five tons.

**4**

Car dumpers for various special operations are available. This rotary dumper is one unit. Also camelbacks and other dumpers.

**5**

Lohed tram car in dump position shows strong, lightweight construction. Dumps clean every time. A complete line of mine and man cars.

**6**

Many new and original features in hoist design and construction, incorporated in Lake Shore hoists, have set new standards of performance and safety in many mines. This is one of many offered by Lake Shore.

**7**

Vertical skips, inclined skips—all from Lake Shore. The patented "Jeto" bottom dump skip is shown here. Also Kimberly skips. For every shaft or headframe.

**BRANCH OFFICES:**

17 Battery Place, New York      37 California St., San Francisco  
1025 London Road, Duluth      610 South 19th Avenue, Phoenix  
211 Wazee Market, Denver      8 South Michigan, Chicago

**LAKE SHORE, Inc.**  
Lake Shore Engineering Division  
IRON MOUNTAIN 1, MICHIGAN

# MERRICK SCALE MFG. COMPANY

180 Autumn Street, Passaic, New Jersey

## Specialists in Automatic Weighing Equipment

The products of Merrick Scale Mfg. Company, although essentially weighing devices, are designed to function in a much broader capacity in many difficult controlling operations peculiar to the Process Industries.

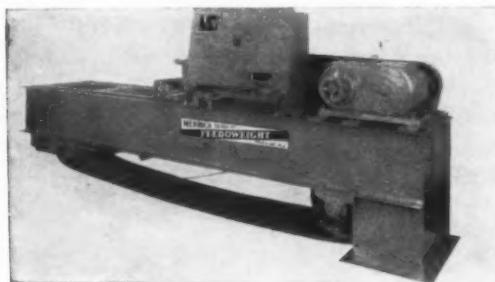
We have had over 40 years' experience in building equipment to solve such production problems as the weighing of materials in transit, automatic proportioning and batching of materials, weighing of liquids, and accurate totalizing and recording of continuously conveyed

material without interruption of process.

The Weightometer, Feedoweight, and other Merrick weighing devices are carefully engineered for many other useful applications throughout the Industry than can be described on these pages. For complete data on these important items of production equipment, briefly outline your problem and mail it to the above address. Full information and covering literature will be sent to you without obligation.

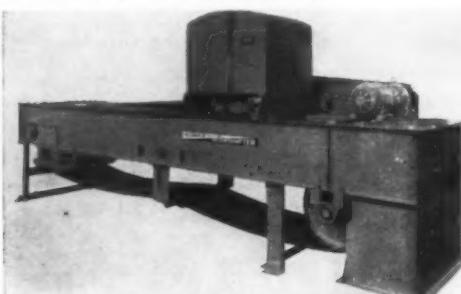
The Merrick WEIGHTOMETER is a self contained integrating and totalizing conveyor scale for use with an existing belt conveyor of any width and capacity. It combines the principles of a platform scale and mechanical integrator. By utilizing a portion of the Conveyor Belt as the Weighing Platform and mechanically multiplying the weight on the belt by the belt speed through a mechanical integrator, a totalized weight is automatically obtainable in tons, pounds, barrels or other unit of measure per hour on a Master Totalizing Counter.

Any material that can be conveyor handled can be accurately weighed by a Weightometer. Such materials as coal, ore, sand, gravel, fish, fish products, minerals of all kinds, cement, fertilizer, filter cake, wood chips, sludge, etc., are common to the Weightometer. Weighing is accomplished without expense or interruption to conveyor flow. Neither are the services of a Weighman required. Easily installed, simple in operation, durable, automatic and accurate. All working parts are enclosed.

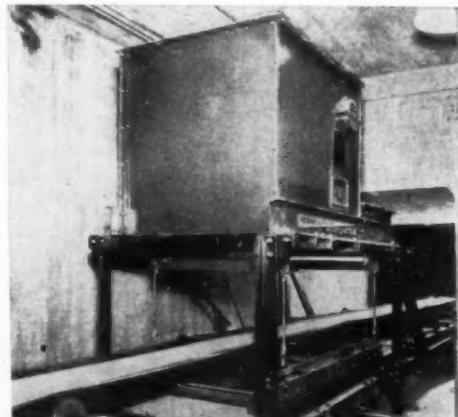


**FEEDOWEIGHT\***

The WSS WEIGHTOMETER is offered for use where a conventional belt conveyor is not available for installation of a standard WEIGHTOMETER. The WSS is supplied complete with its own short belt conveyor, carefully and rigidly constructed to provide good weighing conditions; with motor drive and short supports for easy installation at customer's plant. Usually built with flat belt with moulded flanges along both edges with continuous skirts to prevent side spill of material off the belt during travel and weighing.



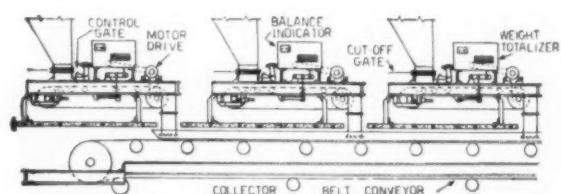
**WSS WEIGHTOMETER**



**WEIGHTOMETER\***

The FEEDOWEIGHT is a dual-purpose machine which correctly and uniformly feeds material by weight and, in addition, automatically totalizes the weight of all materials so fed.

The FEEDOWEIGHT delivers accurate amounts of material according to a predetermined setting, the control being accomplished by means of an automatic gate regulated by a special Powered Feed Regulator rather than by direct connection to scale beam. The scale beam is left free to respond instantaneously to any and all changes of load as it is completely independent of the proportioning mechanism.



The drawing above illustrates an application of three FEEDOWEIGHT units used in a battery arrangement for a proportioning operation. Each unit accurately weighs its own material, automatically controls the rate of feed, and continuously totalizes its weight. Should any hopper become empty, all units in the battery automatically shut down.

\* Reg. U.S. Pat. Off.

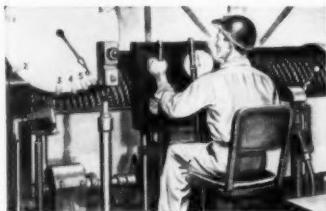
# MSA

SAFETY EQUIPMENT HEADQUARTERS

**...a complete product line  
that brings greater safety,  
increased production  
to mining operations**

#### M.S.A. HOISTPHONE

Dependable voice communication between hoisting engineer and moving cage, or at any level. Ideal for load leveling, shaft repairs, inspections. Also available—the M.S.A. MinePhone for instantaneous communication of orders to moving locomotives for improved haulage.



#### M.S.A. CHEMOX®

Provides complete breathing protection in any atmosphere for a minimum of 45 minutes. Chemox generates its own oxygen from replaceable chemical canister. Weighs only 13½ lbs. Comfortable in service. U. S. Bureau of Mines Approved.



#### M.S.A. McCAA TWO-HOUR OXYGEN BREATHING APPARATUS

Assures complete breathing protection in unbreathable atmospheres for a minimum of two hours. U. S. Bureau of Mines Approved.



#### M.S.A. DUSTFOE RESPIRATOR

Light weight, compact, comfortable. A dust respirator that provides maximum protection. U. S. Bureau of Mines Approved.



#### M.S.A. "ALL-SERVICE"® MASK

Dependable breathing protection against smoke and toxic gases including carbon monoxide singly or in combination, where there is no oxygen deficiency. Unit is U. S. Bureau of Mines Approved.



#### M.S.A. PNEOLATOR

Automatic artificial respiration device that assures maximum chances of recovery to those overcome by poisonous gases, electrical shock or other causes of asphyxia. Unit is protected by rugged carrying case.



#### M.S.A. MIDGET IMPINGER

A portable instrument for quick and dependable dust sampling. Entirely self-contained and hand operated. Ideal for dust control and survey work.

#### OTHER M.S.A. PRODUCTS FOR THE MINING INDUSTRY

Belts—Goggles—Safety Clothing—Carbon Monoxide Tester—Methane Detectors and Recorders—Stretcher Outfits—First Aid Kits and Materials. Send for our Mining Catalog for complete details on all products.



When you have a safety problem, M.S.A. is at your service. Our job is to help you.

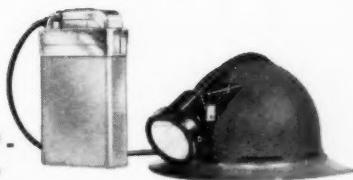
#### MINE SAFETY APPLIANCES COMPANY

201 North Braddock Avenue, Pittsburgh 8, Pa.  
At Your Service: 77 Branch Offices in the  
United States and Mexico

#### MINE SAFETY APPLIANCES CO. OF CANADA, LTD.

Toronto, Montreal, Calgary, Edmonton, Winnipeg,  
Vancouver, Sydney, N. S.

#### EDISON R-4 ELECTRIC CAP LAMP - M.S.A. TYPE K HAT



Today's modern mining methods call for more and better illumination. You'll find a dependable and profitable answer in the Edison R-4 Lamp. Its brilliant, unfailing beam permits miners to operate modern equipment at its greatest capacity, safely.

The famous Type K Skullgard is strong, light, durable, comfortable. Unaffected by oil, water, perspiration. Provides maximum head protection. Write for details.

#### M.S.A. SELF-RESCUER

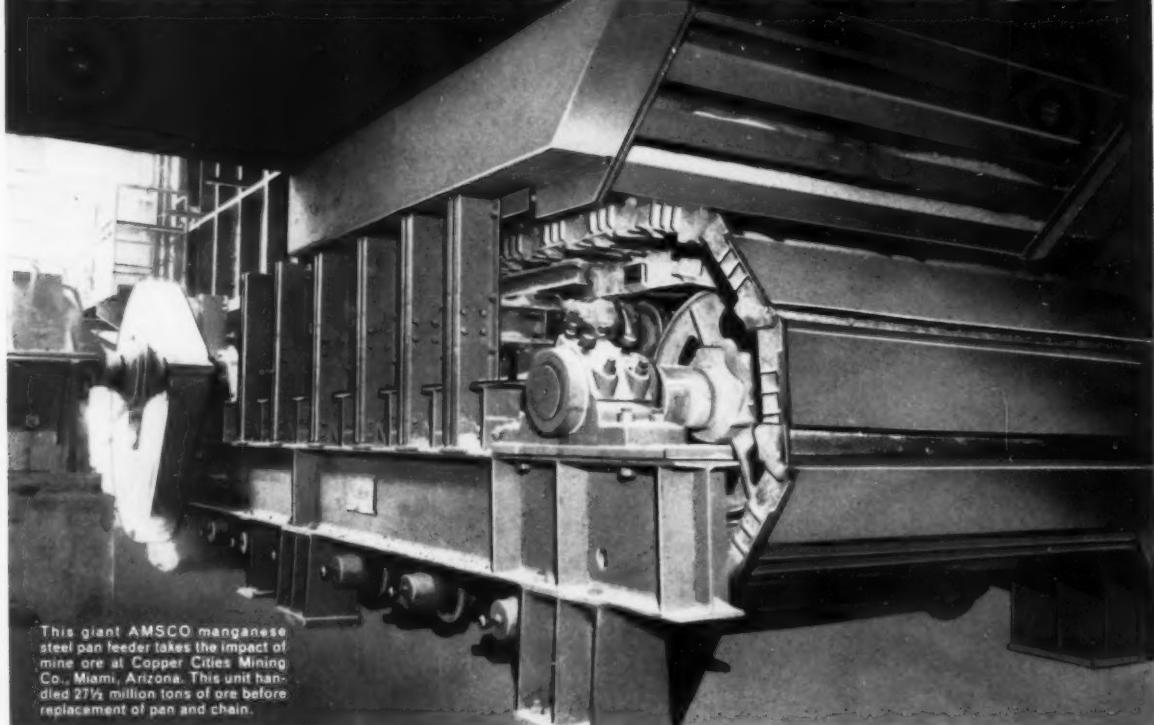
For immediate breathing protection in emergencies. Vital to the miner while traveling through carbon monoxide to fresh air. Available in cache assemblies for storage throughout the mine, or in individual carrying cases. U. S. Bureau of Mines Approved.



#### M.S.A. DUSTFOE RESPIRATOR

Light weight, compact, comfortable. A dust respirator that provides maximum protection. U. S. Bureau of Mines Approved.

# STEPHENS-ADAMSON



This giant AMSCO manganese steel pan feeder takes the impact of mine ore at Copper Cities Mining Co., Miami, Arizona. This unit handled 27½ million tons of ore before replacement of pan and chain.

## heavy duty ahead for your ore *Conveyor System*

How will you move a lot of ore under or over the ground, through processing, in and out of storage, to and from shipping—move it fast, at the least cost?

Mechanization is the way, the S-A way, and it's done by close prior study of your requirements by the best engineering brains in the bulk material conveying industry. These men are backed by a quality line of material handling and conveying equipment designed to move any type of ore in any quantity.

Long range planning of your ore handling needs is important. This calls for a conveyor system engineered for the years to come. You can find these kind of STEPHENS-ADAMSON systems everywhere in the world, moving all kinds of ore products at rock bottom cost.

Wherever you are, S-A engineers can design, build and install your conveyor system. They are available to work with your engineers or with your consultants.

S-A manufactures a wide range of material handling products in three complete plants in U. S. and Canada.

Belt Conveyors  
Belt, Pan & Plate Feeders  
Ship Loading Boom Conveyors  
Stacking Conveyors  
Storage & Reclaiming Systems  
"Natural Frequency" Vibrating Conveyors  
REDLER Conveyor-Elevators  
ZIPPER Conveyor-Elevators  
Conveyor Belt Cleaners

Headshaft Holdbacks  
Grizzlies & Screens  
Centrifugal Pilers  
Bin Gates & Tunnel Gates  
Car Pullers & Spotters  
Bucket Elevators  
Skip Hoists  
SEALMASTER Ball Bearing Units

• Write for a bulletin on any of the above products.



A South American copper mine has been using an S-A system for 25 years. The original installation totals 18,485 feet and in terms of ore delivered is in the multi-million ton class. Six AmSCO feeders are included in the system. S-A carriers, probably the largest ever built, weigh almost 1000 lbs. each.



Handling a wide variety of zinc ores, a complete S-A system conveys to storage by means of feeders, bucket elevator, shuttle conveyor, and centrifugal pilers. SACO speed reducers are used on all conveyor drives and spring type belt wipers keep belt surfaces clean. Close-up here shows centrifugal thrower.



### STEPHENS-ADAMSON MFG. CO.

MAIN OFFICE AND PLANT  
130 RIDGEWAY AVENUE, AURORA, ILLINOIS  
PLANTS LOCATED IN: LOS ANGELES, CALIF.  
CLARKSDALE, MISS. • BELLEVILLE, ONTARIO

SALES ENGINEERS ARE LOCATED IN ALL MAJOR CITY AREAS TO SERVE YOU!



## New copper refinery at Reading, Pa. incorporates outstanding design innovations

Treadwell designed, manufactured and erected the complete casting and handling system for the new plant of Reading Metals Refining Corporation at Ontelaunee Township, Reading, Pa. The refinery will turn out billets to be drawn into tubes by the company's parent concern, Reading Tube Corporation.

The anode-casting wheel is furnished complete with automatic stop and manual start, ladle, ladle pouring mechanism, automatic knockout mechanism, all cooling and dressing equipment and mold-making mechanism. Also included are the anode take-off crane and bosh tanks.

The billet wheel features automatic stop and manual start operation and is pushbutton controlled. The pouring ladles are equipped with remotely controlled leveling devices. The wheel has automatic dump, cooling and conveying equipment.

Treadwell recommended and developed specifications for a Germanium rectifier for the tank house. The company also erected the waste-heat boilers, duct work, stacks, reverberatory-type furnaces, water-treating plant, air compressor, air piping and water piping, which includes the necessary piping from the river to the site.

Treadwell engineers will work with you to achieve a completely modern setup. For further details of Treadwell service and equipment, send for a copy of bulletin 70.

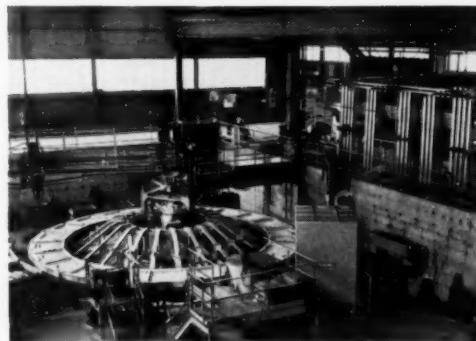
### M. H. TREADWELL COMPANY, INC.

140 Cedar Street, New York 6, N. Y.

1015 Farmers Bank Bldg., Pittsburgh 22, Pa. • 1208 So. LaSalle St., Chicago 4, Ill.

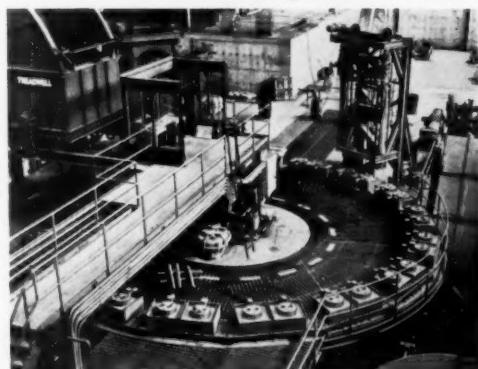
# TREADWELL

Non-Ferrous  
Smelting and Refining  
Equipment

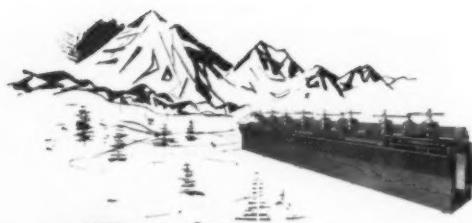
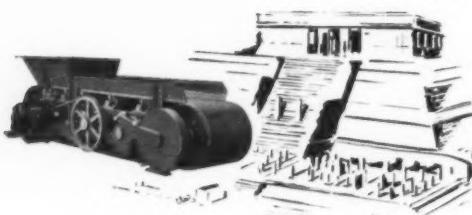
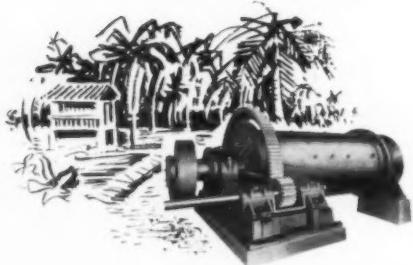
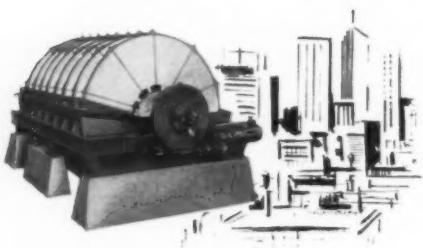
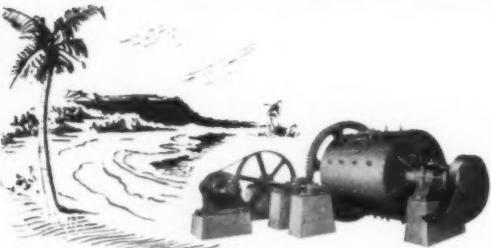


ABOVE: Anode-casting wheel

BELOW: Billet-casting wheel



# PERFORMANCE-PROVED IN 103 COUNTRIES



**MORSE BROS. MACHINERY CO.**

A reliable source for all metallic and non-metallic ore dressing plants. Send us your flow sheet for prompt quotation.

ESTABLISHED 1898

2900 BRIGHTON BLVD., DENVER, COLO., U.S.A. CABLE "MORSE"



MORSE BROS. MACHINERY CO.  
ESTABLISHED 1898

**MORSE BALL MILLS** point the way to new efficiency and economy of operation. Made in 30-inch, 3-foot and 4-foot diameters, their wave type head and shell liners are crafted of hard-iron, molychrome or manganese steel. The large diameter heavy construction trunnion bearings are self-aligning. The 3-foot and 4-foot mills have three-bearing countershafts with sole-plates for lateral adjustment of gears. Scoop or combination drum and scoop feeders available. Bulletin #D-575 tells all about our world-famous ball mills.

**MORSE "CONTINUOUS" DISC FILTERS** are part of the industrial heart of Pittsburgh. Preferred over other types because they require less floor space per ton of material treated, they can filter concentrates of different materials simultaneously. Sizes range from 4-foot, one disc filters, to 8-foot, eight disc filters, offering as little as 22, or as much as 800 square feet of filter area to handle a wide latitude of assignments. For particulars, write for Bulletin #D-5710.

**MORSE ROD MILLS**, wherever they're in use, offer low power costs per ton of ore ground, with maximum working efficiency. Manufactured in sizes of 3-foot and 4-foot diameters, up to 11 feet in length. They are the practical choice for grinding coarse feeds up to 65 mesh. Years of dependable service have proven their worth in service around the world. For full details, including capacity and grinding rod data, write for our Bulletin #D-575.

**MORSE SILENT "VARI-STROKE" ORE FEEDERS** combine flexible capacity with dependable performance, silent operation and simple regulation. They excel for feeding dry or wet crushed ore in uniform and pre-determined quantities from ore bins to grinding machinery. Belt speeds vary from 0 inch to 7 feet per minute with movement precisely controlled at all times. Request Bulletin #D-579.

**MORSE "JETAIR" FLOTATION CELLS** employ new and unique principles of aeration and agitation to make them universally acceptable for metallurgical efficiency and mechanical dependability. They're available in a wide range of sizes from 7 to 700 cubic feet per cell. Each individual cell has its own weir gate pulp level control. For detailed information, write for Bulletin #D-572.

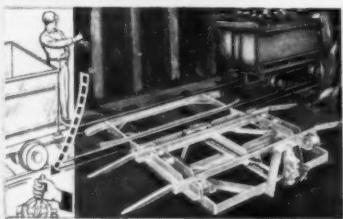
# Half Century Rugged, Dependable profit-paying Equipment

A-M-D-C-O



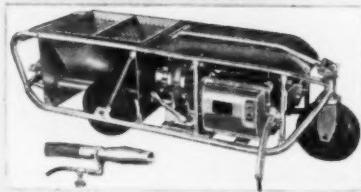
*Canton Mine Door*

The Automatic Door operates mechanically by weight of car on activating levers. Air power operation may be had where desirable. Operates at any trip speed. Two doors provide air lock.



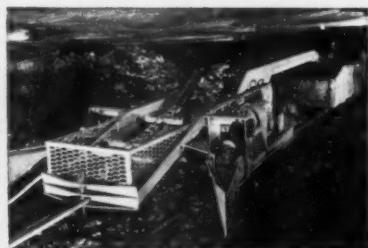
*Canton Car Transfers*

No alterations to track. Quickly installed and relocated—less rib to shoot than for jump switch—no hazards of cherry picker. Anti-friction bearings for easy hand operation. Manual or compressed air models available. (Air model illustrated.)



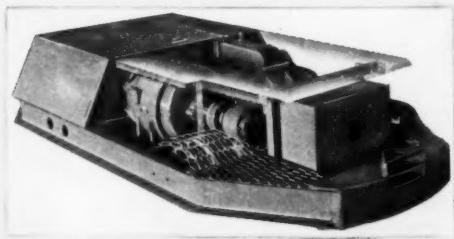
*Wet or Dry Dusting*

"Canton" Little Chief goes anywhere . . . rubber tire model 22½" high; skid model 18½" high for shuttle buggies, belts or mine cars; track-mounted for haulage roads. Delivers 34 to 60 lbs. dust per minute through 50 to 400 ft. 1¼" hose.



*Canton Track Cleaners*

Hydraulic controls throughout clean entire track area mechanically in one pass—no costly hand labor; no dozers or loaders required. Now operating economically in coal, iron, copper, lead, potash, and salt mines.



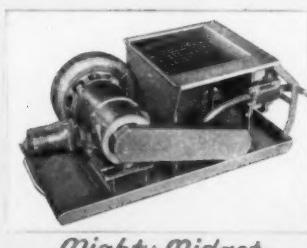
*Dustmaster*

The Track Mounted Hi-Pressure "Dustmaster" is the most powerful Duster ever built. Distributes dust to back areas 300 ft. from haulway.



*Canton Cable Splicer*

"Canton" Cable Splicers reduce down time in splicing cable. Machine men should carry a pocketful. Just pound around "cable and go on working. No special tools.



*Mighty Midget*

Weighs only 280 lbs. Easily moved on shuttle car. Hand cart available. Ideal for small mines . . . inexpensive . . . capacity 7 tons per shift.



Restores insulation to original condition. Used with Canton Splicers, strong as original cable.



*Canton Vulcanizer*

Write for complete brochures.  
Please use street and zone numbers.

**The American  
Mine Door Company**

2071 Dueber Ave., Canton 6, Ohio



NC-I MINE  
CAR TRUCKS



NATIONAL  
CUSHIONING UNITS



*every day, every year more and more  
mine cars and locomotives are equipped  
with*

## NATIONAL DEVICES

No matter whether you're considering the purchase of new mine cars or locomotives . . . or whether you're thinking of upgrading existing equipment now is the time to investigate the advantages of National devices.

For every day cost-conscious operators everywhere are switching over to National devices because they know they get more out of their equipment investment per workshift . . . per day . . . per year.

AA-6782\*

**NATIONAL MALLEABLE-CASTINGS COMPANY**  
Established 1868 Cleveland 8, Ohio

WILLISON AUTOMATIC COUPLERS • RUBBER CUSHIONED UNITS • NACO STEEL LINKS  
and SWIVEL HITCHINGS • MINE AND INDUSTRIAL CAR TRUCKS • NACO STEEL WHEELS

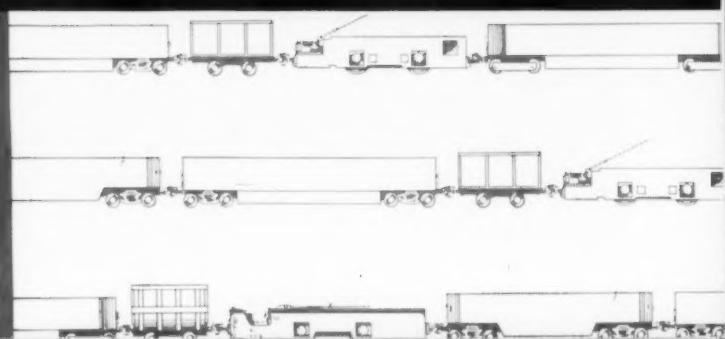
CANADIAN SUBSIDIARY National Malleable and Steel Castings Company  
of Canada, Ltd. • 128 Simcoe St. • Toronto 1, Ontario

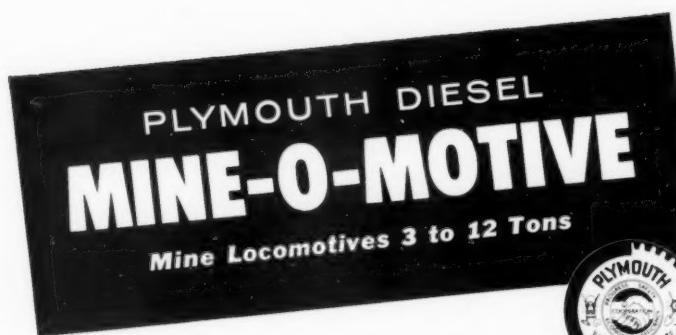


NACO  
STEEL WHEELS



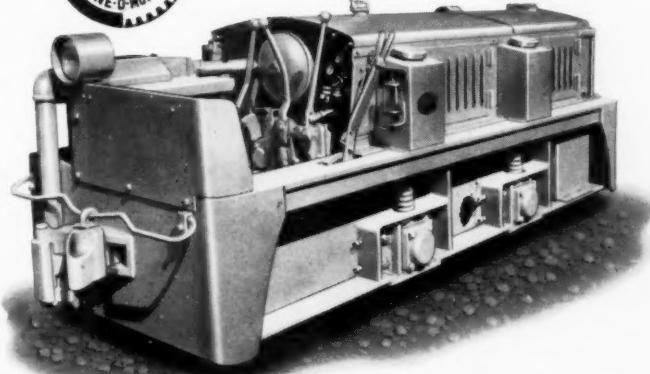
WILLISON  
AUTOMATIC COUPLERS



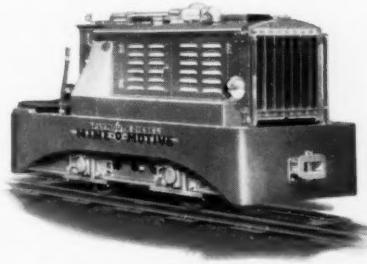
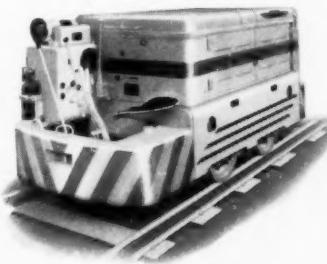
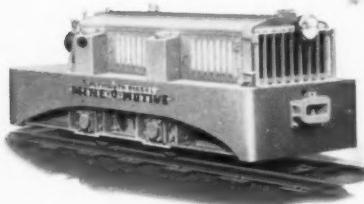


Engineered expressly for  
**YOUR LOCOMOTIVE HAULAGE**  
in Today's modern mining operations

You will find these rugged locomotives performing the toughest hauling jobs in mines and tunnels everywhere. Stamina, stability—ECONOMY in performance, SAFETY in operation—and extra years of trouble-free operation—are ENGINEERED in the design and construction of the Mine-O-Motive series. Controls are convenient, simple, safe. Visibility is excellent. And the Diesel-powered models shown have the famous Torqomotive\* Drive for easy starting and smooth operation. They supplement Plymouth gasoline, Diesel and Diesel-electric models which have served all industry since 1914—and with lowest ton-mile costs in the field.



U. S. Bureau of Mines approved exhaust conditioning equipment.



#### MINE-O-MOTIVE SERIES

**Model FMD-00** 5 or 6 Tons, Torqomotive\* Drive—short wheel base, low center of gravity.



**SERIES T**, mechanical drive, 3, 3½ or 4 Tons. Torqomotive\* Drive in 3½ or 4 Tons.

\*TORQOMOTIVE DRIVE: Plymouth Transmission coupled to Hydraulic Torque-Converter.

#### MINE-O-MOTIVE SERIES Model FMD-22

5, 6, 7, 8 or 10 Tons, Torqomotive\* Drive (this model approved under Permissible Schedule #22, U. S. Bureau of Mines, for operation in gaseous mines).

#### MINE-O-MOTIVE SERIES

**Model DMD-00**, 8 to 12 Tons, with Torqomotive\* Drive — low, compact, one-piece welded frame.

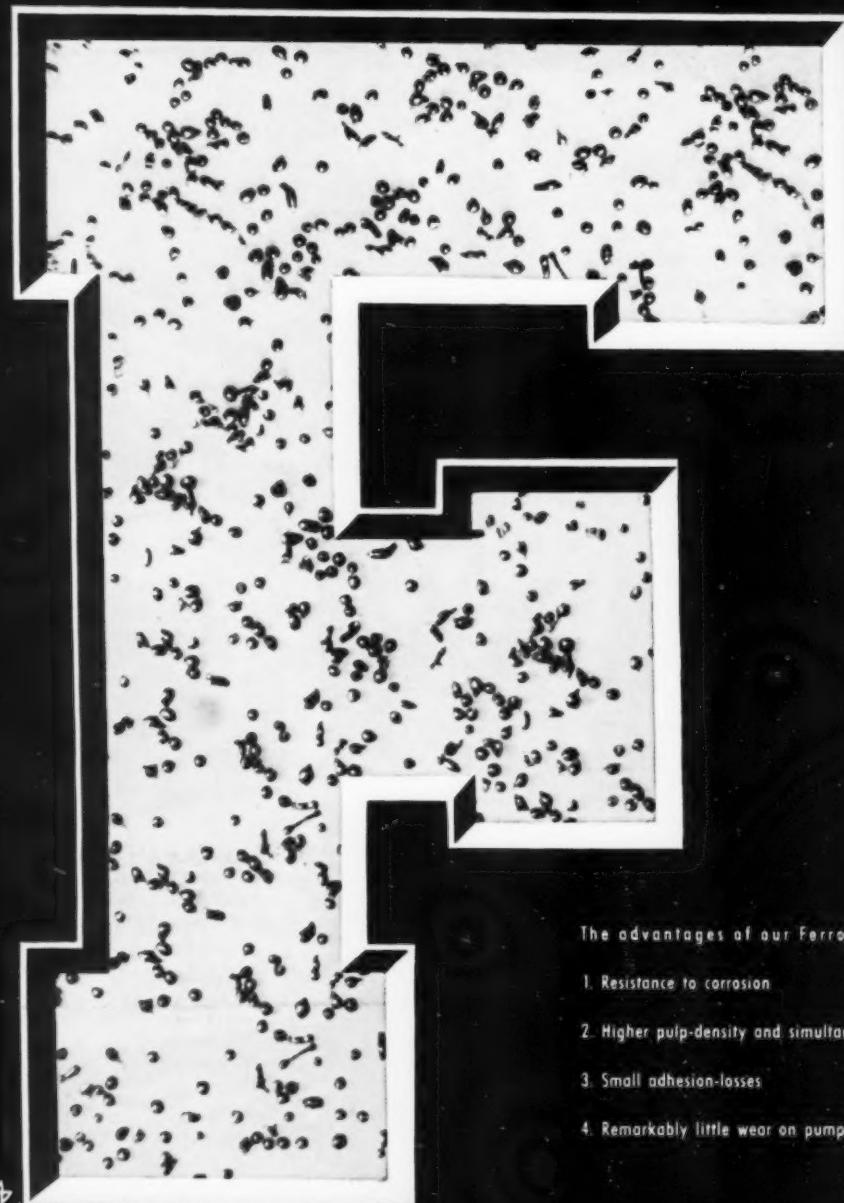
**FREE ANALYSIS** Send us a brief outline of your hauling operations. An engineering analysis will reach you promptly with latest data on the type and size Mine-O-Motive for the best results in the work you want done.

#### PLYMOUTH LOCOMOTIVE WORKS

Division of the Fate-Root-Heath Company,  
Dept. A-26, Plymouth, Ohio

# KNAPSACK ATOMIZED FERROSILICON FOR THE SINK- and FLOAT-PROCESS

15%



#### The advantages of our Ferrosilicon:

1. Resistance to corrosion
2. Higher pulp-density and simultaneously lower viscosity
3. Small adhesion-losses
4. Remarkably little wear on pumps and piping

**KNAPSACK - GRIESHEIM**

AKTIENGESELLSCHAFT

KNAPSACK NEAR COLOGNE, WEST GERMANY

U. S. REPRESENTATIVES:

PROGRESSIVE COLOR AND CHEMICAL CO., INC.  
EMPIRE STATE BUILDING, N.Y. 1, N.Y.

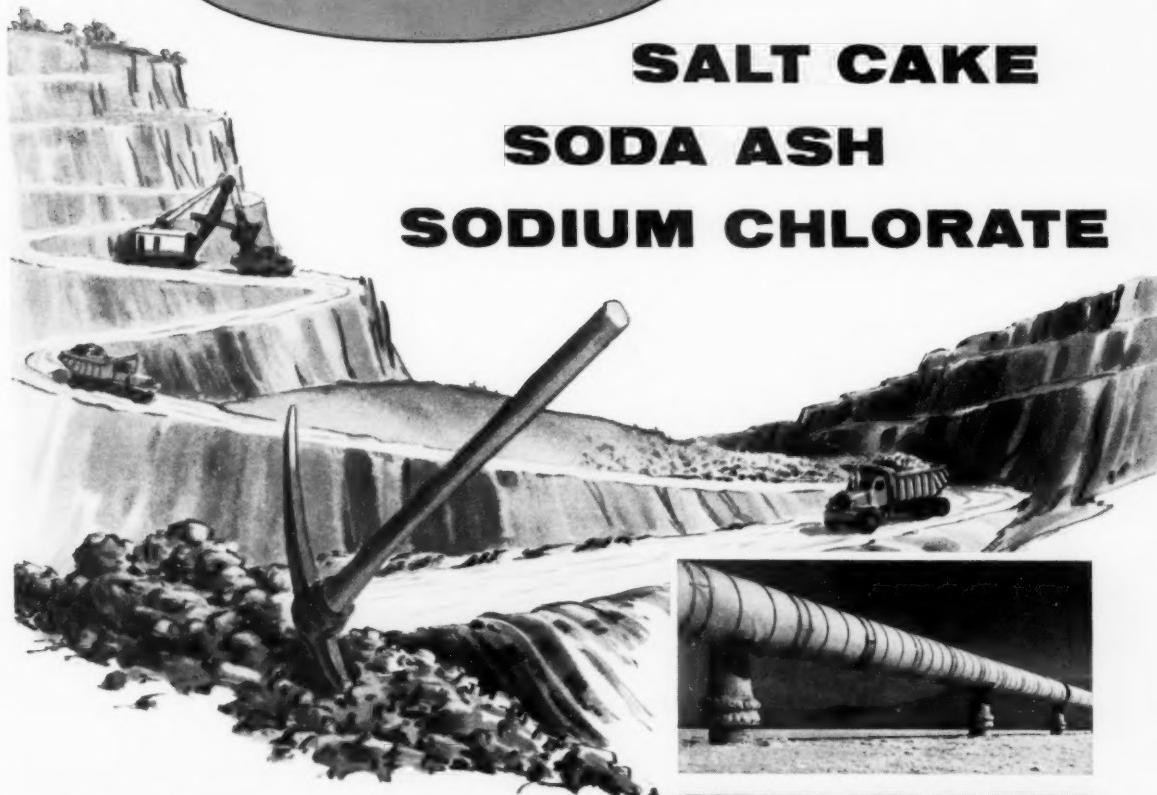


# TRONA

## SALT CAKE

## SODA ASH

## SODIUM CHLORATE



### **pick of the mining world**

TRONA\* Salt Cake, Soda Ash and Sodium Chlorate are improving ore processing everywhere—getting through to pay dirt faster, adding the mark of quality to ore concentrates. In the refining of lead dross and non-ferrous metals, TRONA Salt Cake and Soda Ash provide more effective and thorough ore treatment. In uranium and similar ore processing, TRONA Sodium Chlorate speeds oxidation, upgrades refining action. For your refining process TRONA Chemicals assure a hard working, uniform crystal that improves quality and increases mineral recovery. Make TRONA your choice for faster, more profitable processing. Ample supply and quick delivery are possible—anywhere.

\*Trademark AP&CC

### **American Potash & Chemical Corporation**

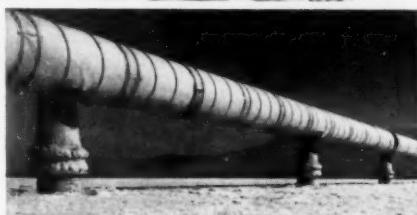
LOS ANGELES • NEW YORK • ATLANTA • SAN FRANCISCO • PORTLAND (ORE.)

Producers of: Borax • Potash • Soda Ash • Salt Cake • Lithium  
• Bromine • Chlorates • Perchlorates • Manganese Dioxide  
and a diversified line of specialized agricultural and  
refrigerant chemicals.

Plants: TRONA and LOS ANGELES, CALIFORNIA

HENDERSON, NEVADA

SAN ANTONIO, TEXAS (American Lithium Chemicals, Inc.)



At Trona, California (top view) high purity Soda Ash and Salt Cake are recovered from the chemical-rich brines of Searles Lake. The Henderson, Nevada, plant (bottom view) produces highest grade Sodium Chlorate by electrolytic processes.

# TRONA



The DART 35SL, hauling 35 Tons Payload. Proven lower cost per ton. Lower load-weight ratio. Just ONE engine, transmission, rear axle!

PROFITABLE PAYLOADS WITH

*Dart* TRUCKS

DART TRUCK COMPANY builds a complete line of trucks—from 10 to 50 Ton payloads. But, any model can be built to meet your special haulage requirements.

WRITE FOR SPECIFICATIONS TODAY

**DART** TRUCKS  
Kansas City 8, Missouri



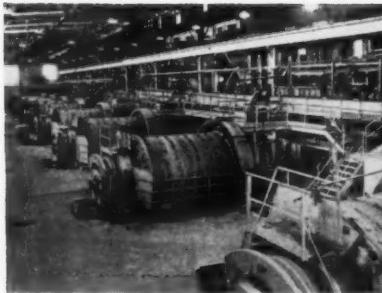
DART 135-UG underground shuttle truck with dual controls and through conveyor.



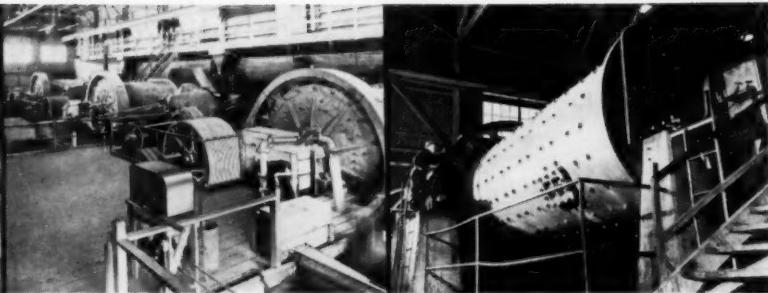
DART's 50 Tonner powered by a 400 or 600 HP Diesel Engine for that big payload.

Bulletin! March 14th Dart Merged With Kenworth Motor Truck Division of Pacific Car & Foundry Company. New Name—KW-Dart Truck Company

D-140



This large copper company has 17, 9½'x 12' and three 10'x 14' Marcy Open End Rod Mills; three 8'x 12' and three 10'x 12' Marcy Grate Discharge Ball Mills.



Three 8'x 9' Marcy Grate Discharge Ball Mills in a large copper mill.

This 8'x 20' Marcy Pebble Mill is one of 21 Marcy Mills used by a molybdenum company.

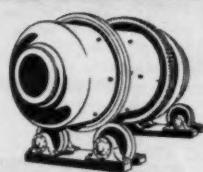
## Marcy Grinding Mills

- grate discharge ball mills, open end rod mills, tube mills, pebble mills, center and end peripheral discharge rod mills, acid-proof mills, batch mills.
- for metallic and non-metallic ores, cement, specification sands, clay, fibrous material.
- wet or dry grinding.
- 29 different diameter sizes, from 12" to 12' 6" inside diameter, are operating and proved in the field.
- grind material 1½" or finer to a product as fine as 325 mesh.
- capacities up to 6650 tons per 24 hours.

### Other Products

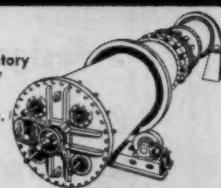


Custom Engineered Pug Mills.



Custom Engineered Leaching Drums.

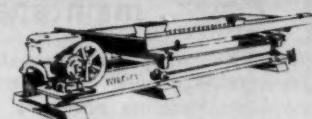
Burt Filters.  
30'x 72" Laboratory Unit, and 5'x 40' Standard Commercial Size.



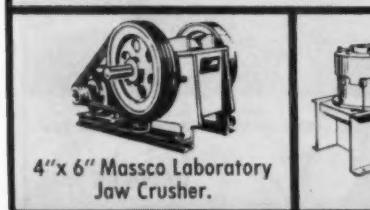
Custom Engineered Fusion Furnace.



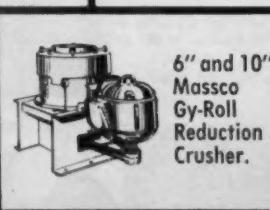
Massco-Grigsby Pinch Valves.  
1" to 14" dia.



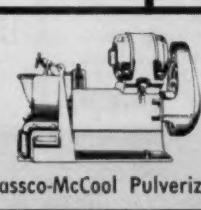
Wilfley Concentrating Tables.  
Laboratory and Commercial Sizes.



4"x 6" Massco Laboratory Jaw Crusher.



6" and 10"  
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Massco-McCool Pulverizer.

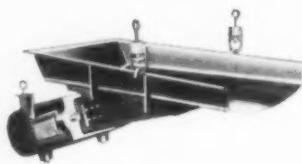


Marcy  
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Controlled feeding of bulk materials — from pounds to hundreds of tons per hour.



**VIBRATING  
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For screening, sizing, scalping, separating, etc. 5 different types. Electromagnetic, mechanical.



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For conveying, preheating, drying, cooling or as picking table. Wide range of sizes.

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SYNTRON Equipment provides an efficient, dependable answer to most of your bulk materials handling problems. Backed by more than one third of a century in equipment manufacturing and application know-how.

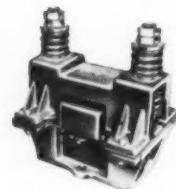
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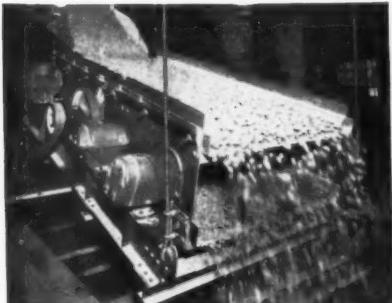
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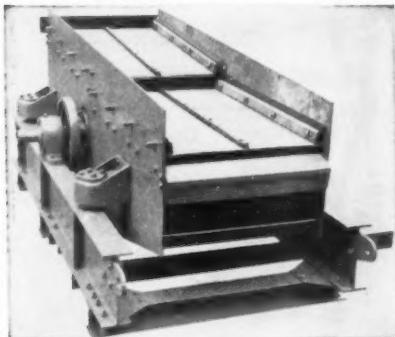
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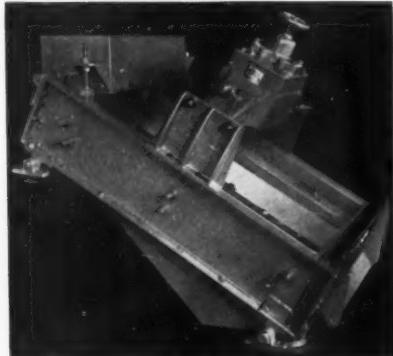
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Ty-Rock Screen (Discharge chutes removed to show material)



Tyler-Niagara Screen



Hum-mer Screen

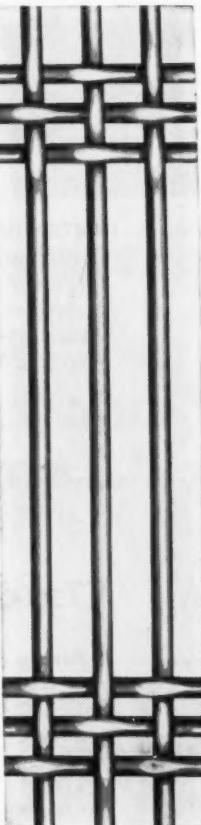
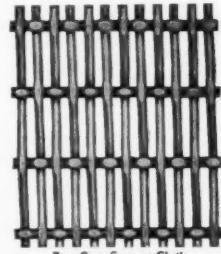


Tyler Standard Screen Scale Testing Sieve

## WOVEN WIRE SCREENS

Supplied in all meshes and metals and for all purposes. Tyler Woven Wire Screen is noted for its accuracy and dependability. More than 7,000 specifications are manufactured, many of which are kept in stock ready for immediate shipment.

Write for Catalog 74, Specification Tables of Tyler Woven Wire Screens.



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This full-floating circle-throw screen combines immense capacity with low operating costs — especially for coarse and medium sizing. This is the ideal screen wherever huge tonnages of coal is handled and where flat or low angle screening is desired. Send for Catalogue 65.

## TYLER-NIAGARA SCREENS

High-speed circle-throw screens for economical screening of coal products. Send for Catalogue 64.

## TY-ELECTRIC HEATED SCREENS

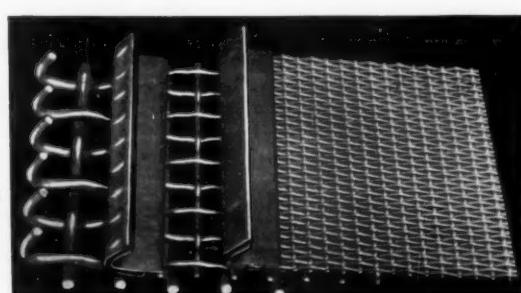
The Ty-Electric System of electric heating of Ty-Rock & Hum-mer Screens represents the most recent development in screening damp materials. The woven-wire screens are heated by passing electric current through the wires. Heat keeps the surface of the wire dry so that fine damp particles will not stick on the wires and blind the openings. Send us details of your damp screening problems so we can make recommendations.

## TYLER HUM-MER SCREENS

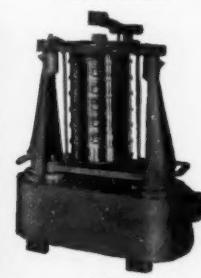
The Hum-mer was the first electrically vibrated screen and is still, by far, the lowest in operating cost for accurate sizing of medium and fine material. The Hum-mer employs less than one H.P. per vibrator and is furnished in one, two or three deck units in both open and closed models. Send for Catalogue 63.

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Tyler Standard Screen Scale Testing Sieves are the accepted standard for sieve testing throughout the world. The Ro-Tap Testing Sieve Shaker and the Ty-Lab Tester assure comparable, accurate data. Send for Catalogue 53.



Tyler Hook-strip and bent edge for screen sections



Ro-Tap  
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# CP EQUIPMENT FOR...

## Exploratory



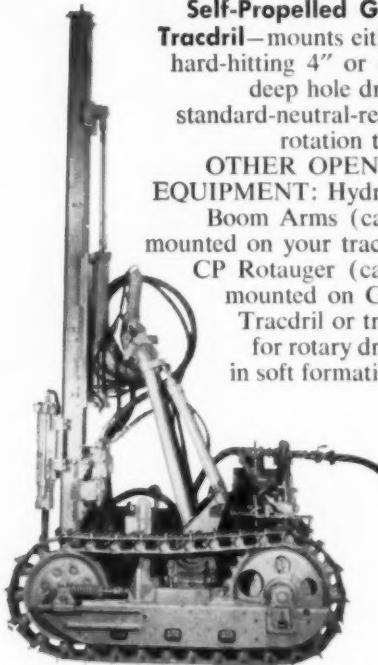
**Versatile Skid-Mounted CP Core Drills**—are also available without skids for mounting on truck or jeep. Furnished with air, electric, gasoline, and diesel drives. Capacities to 2,250 feet with E-EX fittings.

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### Self-Propelled G-800

**Tracdrl**—mounts either a hard-hitting 4" or 4½" deep hole drill in standard-neutral-reverse rotation types.

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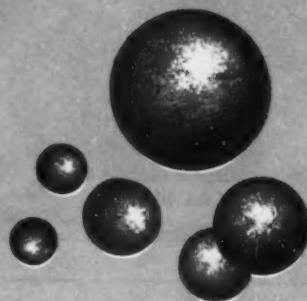
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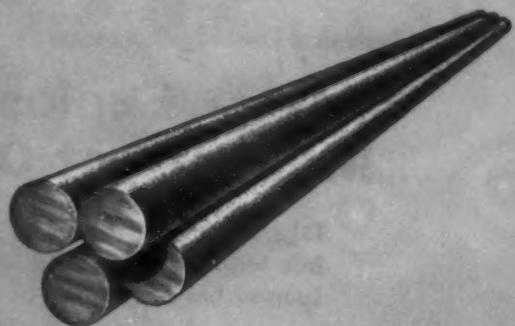
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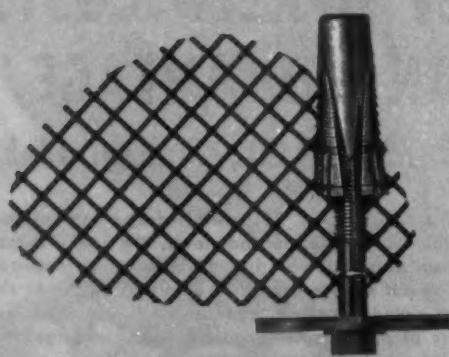
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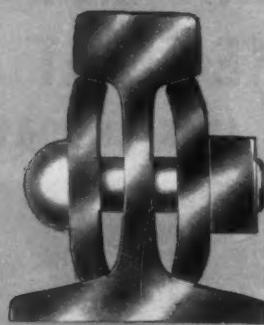
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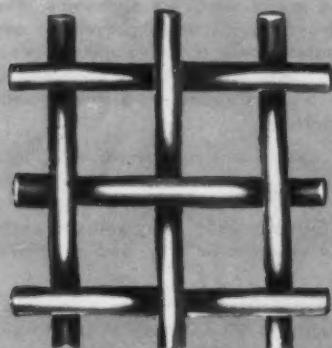
### CF&I rock bolts and Realock metallic fabric

Rock Bolts available in slot and wedge design, or expansion type with the Pattin Shell, designed for easy installation. Reduces need for timbering, while providing safe, economical support for underground mine openings. Realock Metallic Fabric gives important extra support between bolts.



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3803

# "FLEXIBILITY AND LOW UPKEEP COSTS MAKE FLYGT PUMPS AN ADVANTAGE,"

reports LUCKY FRIDAY SILVER-LEAD MINES CO., Mullan, Idaho



While working a 750' shaft-deepening project from the 2300 to 3050 foot level, the Lucky Friday Mine ran into a dewatering problem which required pumping out an average of 150 to 175 GPM. At the start of sinking operations, air pumps were used, but because of periodic extra volume water seepage and excessive repair and maintenance costs, the air pumps were abandoned in favor of Flygt Model B-80L Submersible Electric Pumps.

In the pumping cycle, a Flygt Pump was lowered to the shaft bottom as soon after each blast as possible, and the water was lifted to relay pumps at a higher level, with heads up to 80 feet. The Mine Engineer, in a paper on the operation delivered before the Northwest Mining Convention, said of the Flygt pumping method: "Although the initial cost seemed high at first, the absence of expensive upkeep and the efficient pumping performance justified the investment. The quiet operation of the Flygt was a decided relief after listening to the siren-like air pumps. The Flygt Electric Pump was a distinct improvement over any type of air pump where large volumes of water had to be moved from the shaft bottom. It was low in upkeep cost and its unusual flexibility made it a definite advantage."

Since shaft sinking was completed, two Flygt Model B-80L Pumps now have become a part of the Lucky Friday's permanent mine pumping installation. In service since October 1956, they still are performing with a maximum of efficiency and a minimum of upkeep.

Flygt centrifugal Pumps range in size from 1 1/2"-85 GPM capacity to 8"-3,000 GPM capacity. Head capacities range up to 210 feet. Weights range from 80 to 1,200 pounds.

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- ✓ Electric
- ✓ Resistant to Salt Water
- ✓ Submersible
- ✓ Easy to Handle
- ✓ Low Maintenance Costs
- ✓ Will Pump High Amount of Solids
- ✓ Heavy Duty
- ✓ Continuous Duty
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- ✓ No Installation Costs
- ✓ No Priming Needed



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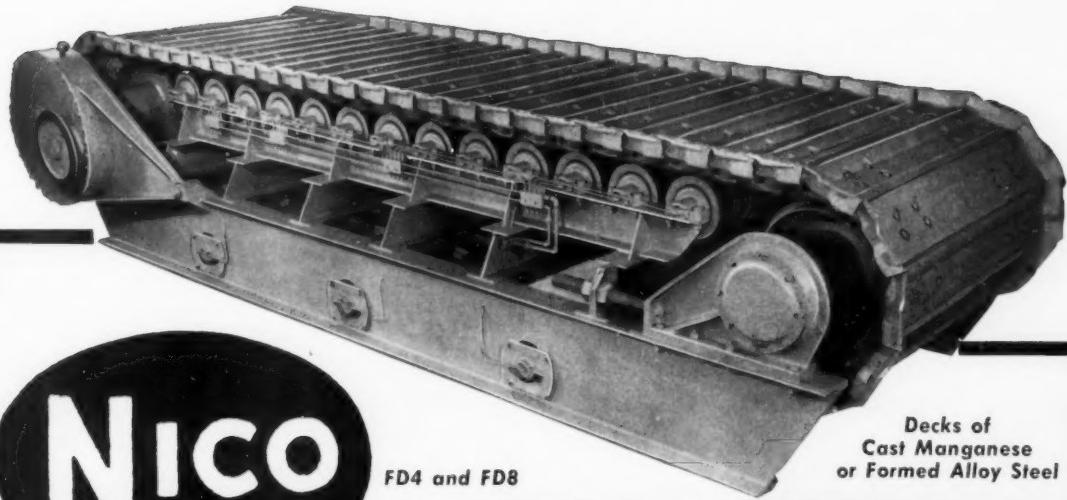
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Shaft mounted NICO Speed Reducer eliminates open gearing, counter shaft, lubrication problems.

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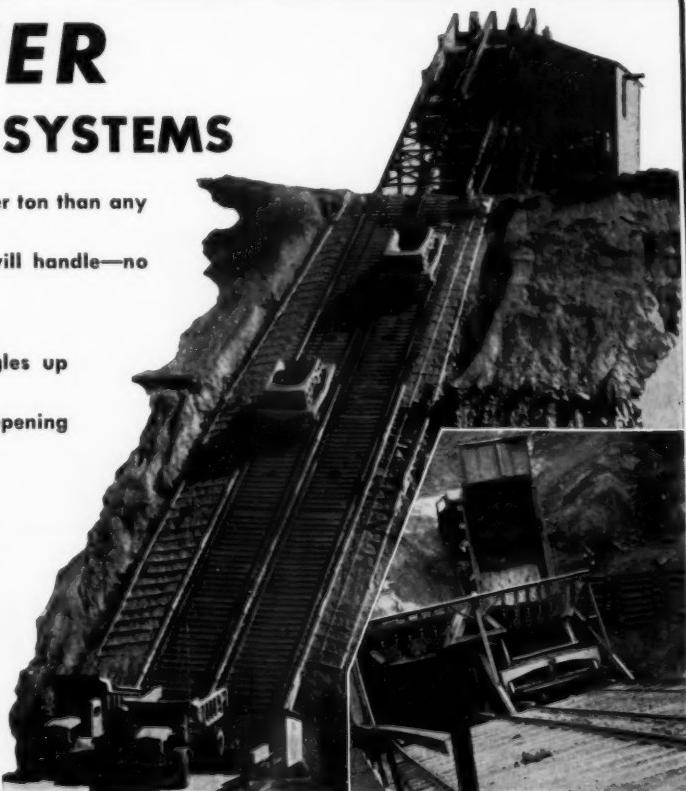
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## ROCKOVER OPEN PIT SKIP SYSTEMS

- Will elevate material at a lower cost per ton than any other system.
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- Use multiple loading stations along trackway if desired.

Skips of from 5 - 35 ton capacities available. Write for information.

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Light-weight, easily installed cables for telephone, signal and communication circuits. Protected by a special neoprene jacket. No metallic tapes necessary. Insulation has ideal electrical and physical characteristics for these uses.

- Available as two-conductor or multi-conductor cables for telephone and communication service. These cables can also be used for block signaling as well as operating electric switch-throwing devices.

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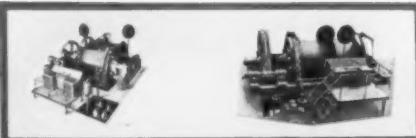
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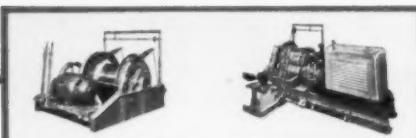
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Custom built for special conditions at 15,000 to 30,000 lbs. rope pull. Radial acting dental clutches; brakes and clutches air or oil operated. Electrical control and safety equipment. For high production use.

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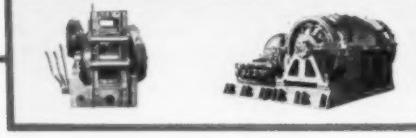
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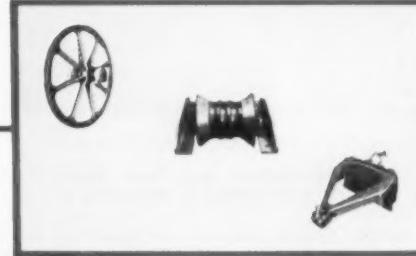
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One-piece scrapers of manganese steel with replaceable liner. Built to match the service of large Vulcan slushers.

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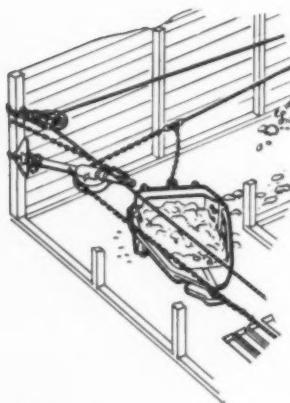
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WIDE THROAT  
CARRYING BLOCKS  
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6" STANDARD  
GENERAL UTILITY  
BLOCK

Half Side Plate and Full Side Plate Models in 8", 10" and 12" sizes with choice of hook, shackle or safety swivel shackle suspension. Manganese steel sheaves and side frames, tapered roller bearings, wide throats. Send for Bulletin No. 271.

**ALLOY STEEL & METALS CO.**



U.S.A. Pat. No. 2716824. Canada Patent 1957  
Other Foreign Patents Applied For

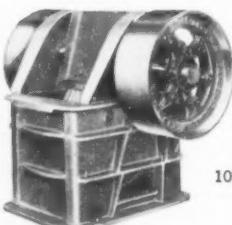
## A TYPE AND SIZE FOR EVERY OPERATION

### PACIFIC "SLUSHMASTER" SCRAPERS

Famous for big load capacity, low horsepower requirements and general "Dig-ability." Used in practically every mining area throughout the world. Send for Bulletin 287 which describes the complete line of Pacific "Slushmaster" Scrapers.

Model	Size	Weight
2A	26"	465#
2A	30"	510#
2A	34"	550#
AB	36"	775#
AB	42"	850#
AB	48"	960#
AB	54"	1080#
3B	36"	1400#
3B	42"	1540#
3B	48"	1730#
3C	60"	2580#
3D	48"	2030#
3D	60"	2865#
3D	72"	3700#
3D	84"	4500#

## OTHER PACIFIC MINING PRODUCTS



10 x 20



BIT KNOCKER  
See Bulletin  
No. 256

Pacific Jaw Crushers are offered in four sizes: 6x12, 8x15, 10x20 and 10x30. Heavy-duty, all-steel constructions. Over-size eccentric shafts. Full-size jaw openings with reversible manganese steel jaws. Feeder screens and Grizzlies also available.

1848 East 55th Street, Los Angeles 58, California

Mailing Address: Box 58323, Vernon Station, Los Angeles 58, California

# 1958 MINING WORLD-WORLD MINING

## Catalog Index

of

## Equipment and Manufacturers

The CATALOG INDEX is comprised of two sections:

SECTION I is an alphabetical listing of the specialized products and equipment used by the MINE-MILL-SMELTER industry. All principal manufacturers of these products and equipment are listed for your convenience.

SECTION II is an alphabetical list of all principal manufacturers AND THEIR ADDRESSES.

The names of manufacturers who are represented in

this issue by catalogs or advertisements are printed in BOLDFACE type in Sections I and II. The page numbers of their catalogs or advertisements are also given in Section II.

Every effort has been made to make your MINING WORLD-WORLD MINING CATALOG ISSUE, Development and Directory Number as complete and accurate as possible. MINING WORLD, however, cannot be responsible for changes in names, addresses, and other discrepancies.

## SECTION I

### Equipment Index

SECTION I contains an alphabetical list of product and equipment names. Wherever feasible, equipment has been indexed under headings representing the nomenclature preferred by the industry; or in many cases under the principal proper noun. For example,

"Flotation Machines" are indexed as such rather than under the all-encompassing heading "Machines." Rock Drills, however, have been most logically listed as "Drills, Rock."

#### ACETYLENE

See Welding Equipment, Supplies, and Services

#### ACID

See Reagents and Chemicals

#### ACTUATORS

See Cylinders and Actuators

#### AERIAL SURVEYING

See Exploration Services

#### AGGLOMERATING

EQUIPT. AND SUPPLIES

See Pelletizing and Nodulizing Equip.

#### AGITATORS AND CONDITIONERS

Black, Sivalls & Bryson, Inc.  
BOOTH CO., INC., THE  
Carrier Corp.

DAVIS—SEE GALIGHER CO.  
DENVER EQUIPMENT CO.  
DENVER SUPER—SEE DENVER EQUIPMENT CO.

Diesel Eng. Corp.—See Klockner-Humboldt-Deutz A. G.  
DORR-OLIVER INC.

Bravo Corp.  
**EIMCO CORP.**  
Galigher Co.  
General American Transportation Corp.

General Electric Co., Ltd., The  
**HARDINGE CO., INC.**

Humboldt, Klockner-Humboldt-

Deutz, A. G.

International Engineering, Inc.  
**KENNEDY-VAN SAUN MFG. & ENG. CORP.**

Klockner-Humboldt-Deutz, A. G.  
Knapp & Bates Ltd.

Miners Foundry & Mfg. Co.  
Minerais et Metaux

MORSE BROS. MACHINERY CO.  
NATIONAL TANK & PIPE CO.

Philadelphia Gear Works, Inc.  
Roots-Conversville Blower Div.

Dresser Industries  
Santa Fe Tank Div., Fluor Products Co.

**SMITH & CO., F. L.**  
Standard Elec. Mfg. Co., Inc.

TELLURIDE IRON WORKS CO.  
WEMCO—SEE WESTERN MACHINERY CO.

Western Gear Works, Pacific Gear Plant

WESTERN MACHINERY CO.  
Westinghouse Air Brake Co., Le Roi Div.

#### AIRCRAFT

SEE EXPLORATION SERVICES

#### AIR DRIVEN TOOLS

See Tools, Air Driven

#### AIR LEG

**ATLAS COPCO, A. B. SWEDEN**

Atlas Copco Eastern, Inc.

**ATLAS COPCO PACIFIC, INC.**

CHICAGO PNEUMATIC TOOL CO.

Cleveland Div., Westinghouse Air

Brake Co.

Consolidated Pneumatic Tool Co., Ltd.

Demag Aktiengesellschaft

Drullard Co., Howard

**GARDNER-DENVER CO.**

Holab Bros. (Canada) Ltd.

INGERSOLL-RAND CO.

JOY MANUFACTURING CO.

TELLURIDE IRON WKS.

Thor Power Tool Co.

Westinghouse Air Brake Co., Cleve-

land Rock Drill Div.

Westinghouse Air Brake Co., (Pa.)

Westinghouse Air Brake Co., Le

Roi Div.

#### GARDNER-DENVER CO.

Westinghouse Air Brake Co., Cleve-  
land Rock Drill Div.

Westinghouse Air Brake Co., Le

Roi Div.

#### MECHANICAL

Cleveland Div., Westinghouse Air  
Brake Co.

Drullard Co., Howard

**GARDNER-DENVER CO.**

INGERSOLL-RAND CO.

Thor Power Tool Co.

Westinghouse Air Brake Co., Cleve-

land Rock Drill Div.

Westinghouse Air Brake Co., (Pa.)

Westinghouse Air Brake Co., Le

Roi Div.

#### ASSAY SUPPLIES

See Laboratory Equipment  
and Supplies

#### ASSAYERS

See Laboratories & Assayers

#### AUGERS

See Drills; Bits

#### BAGS

##### FILTER BAGS

**AMERICAN AIR FILTER CO., INC.**

**BEMIS BRO. BAG CO.**

**EIMCO CORP., THE**

Filter Fabrics, Inc.

Hazemag of Germany

Menardi & Co.

## Ball Mills

National Filter Media Corp.  
**NORTHERN BLOWER CORP.**  
Peterson Filters & Engineering Co.  
Pendleton Woolen Mills  
Westinghouse Air Brake Co., Le  
Roi Div.

### ORE AND CONCENTRATE BAGS

Arizona Bag Co.  
**BEMIS BRO. BAG CO.**  
CROWN ZELLERBACH CORP.  
Custom Products Company  
Filter Fabrics, Inc.

### SAMPLE BAGS

Arizona Bag Co.  
**BEMIS BRO. BAG CO.**  
Custom Products Company  
**DFC—SEE DENVER FIRE CLAY  
CO., THE**  
**DENVER FIRE CLAY CO., THE**  
Drullard Co., Howard  
Filter Fabric Inc.  
Hammond Bag & Paper Co.  
**HANOVER INDUSTRIES, INC.**  
Tamping Bag Co., The  
Union Bag & Paper Co.

### BALL MILLS

See Grinding Equipment

### BALLS

See Grinding Equipment

### BATTERIES

See also Safety Equipment

### AUTOMOTIVE AND LIGHT PLANT

C&D Batteries, Inc.  
Electric Storage Battery Co., The  
Exide Industrial Div.  
Gates Rubber Co.  
**GENERAL MOTORS OVERSEAS  
OPERATIONS**  
General Petroleum Corp.  
Gould-National Batteries, Inc.  
**GRAYBAR ELECTRIC CO., INC.**  
Gulf Oil Corp.-Gulf Refining Co.  
**INTERNATIONAL B. F. GOOD-  
RICH**  
U. S. Rubber Int'l.

### LOCOMOTIVE

C & D Batteries, Inc.  
C & D Silver-Clad—See C & D Bat-  
teries, Inc.  
Edison Inc., Thomas A.  
Electric Storage Battery Co., The  
Exide Industrial Div.  
Exide-Ircleclad—See Electric Stor-  
age Battery Co., The Exide In-  
dustrial Div.  
Gould-National Batteries, Inc.  
**INTERNATIONAL B. F. GOOD-  
RICH**

### BATTERY CHARGERS

See Chargers, Battery

### BEARINGS

#### BALL

Dodge Mfg. Corp.  
**FRICITION FIGHTER—SEE LINK-  
BELT CO.**  
General Motors Corp., New De-  
parture Div.  
**LINK-BELT CO.**  
MRC—see Marlin-Rockwell, Inc.  
Nice Ball Bearing Co.  
SC & SCM—see Dodge Mfg. Co.  
S K F Industries Inc.  
**SEALMASTER—SEE STEPHENS  
ADAMSON MFG. CO.**  
**STEPHENS-ADAMSON MFG. CO.**

#### ROLLER

Chain Belt Corp.  
Dodge Mfg. Co.  
Dodge-Timken—see Dodge Mfg. Co.  
**FRICITION FIGHTER—SEE LINK-  
BELT CO.**  
**LINK-BELT CO.**  
Marlin-Rockwell, Inc.  
Roller Bearing Co. of Amer.  
Rollway Bearing Co., Inc.  
S K F Industries, Inc.  
Shafer—see Chain Belt Co.  
**TIMKEN ROLLER BEARING CO.**  
Tyson Bearing Corp.

#### SLEEVE

**AMERICAN BRAKE SHOE CO.**  
Ampco Metal, Inc.

Ampco Metal Bronze—see Ampco  
Metal, Inc.  
Dodge Mfg. Corp.  
**LINK-BELT CO.**  
Mosebach Electric & Supply Co.  
Sievwold—see Dodge Mfg. Co.  
**STEARNS-ROGER MFG. CO.**  
Tapered—see S K F Industries, Inc.

### BELL SYSTEMS

See Communications

### BELTS AND BELTING

See also Conveyor Equipment;  
Fasteners, Belts, Safety Equip-  
ment

#### CHAIN, LINK AND METAL

**AMERICAN BRAKE SHOE CO.**  
**AMERICAN BRAKE SHOE CO.**  
AMER. MANGANESE STEEL  
DIV.

**AMSCO—SEE AMERICAN BRAKE  
SHOE CO.**

American Chain & Cable Co., Inc.  
American Chain Div.

Rodinson Mfg. Co.

**COLORADO FUEL & IRON  
CORP.—THE**

Conveyor Co., The

Korb-Pettit Wire Fabrics & Iron  
Works, Inc.

**LINK-BELT CO.**

Taylor-Wharton Iron & Steel Co.

**TELLURIDE IRON WKS.**

Thiele, August G.m.b.H.

**U. S. STEEL EXPORT CO.**

Yuba Manufacturing Div.

**WISCO—SEE COLORADO FUEL  
& IRON CORP.**

#### LEATHER BELTING

Carlyle Rubber Co., Inc.  
Conveyor Co., The

Dodge Mfg. Corp.

Gates Rubber Co.

Goodall Rubber Co.

Houghton Co., E. F.

**MINE & SMOELTER SUPPLY CO.**

THE MARCY MILL DIV.

Rhoads & Son, J. E.

Tannate—see Rhoads & Son, J. E.

Vilm-Tred—see Houghton & Co.,

E. F.

Williams & Sons, I. B.

#### RUBBER BELTING

##### Flat Belts

**AJAX—SEE HEWITT-ROBINS,  
INC.**

American Rubber Mfg. Co.

**BARBER-GREENE COMPANY**

Bear—see American Rubber Mfg.

Co.

Boston Woven Hose & Rubber Co.

Carlyle Rubber Co., Inc.

Chamberlain Latex Rubber & Tire

Co., Republic Rubber Div.

Conveyor Co., The

Crackerjack—see American Rubber

Mfg. Co.

Gates Rubber Co.

Goodall Rubber Co.

Goodrich Co. B. F., The Industrial

Prod. Div.

Goodyear Tire & Rubber Co.

**HEWITT-ROBINS, INC.**

INTERNATIONAL B. F. GOOD-  
RICH

Invader—see Lee Rubber & Tire

Corp., Republic Rubber Div.

Korb-Pettit Wire Fabrics & Iron

Wks., Inc.

Lee Rubber & Tire Corp., Republic

Rubber Div.

**MALTESE CROSS—SEE HEWITT-  
ROBINS, INC.**

Quaker Pioneer Rubber Mills

Quaker Rubber Co.

Raybestos-Manhattan, Inc.

Republic Rubber Div., Lee Rubber

& Tire Corp.

Rhoads & Sons, J. E.

Thiele, August G.m.b.H.

**HERMOID CO.**  
United States Rubber Co.  
United States Rubber Int'l.  
Williams & Sons, I. B.  
Yosemite—see American Rubber  
Mfg. Co.

### RUBBER BELTING

#### V-Belts

**ALLIS-CHALMERS MFG. CO.,**

INDUSTRIES GROUP

Boston Woven Hose & Rubber Co.

Cariyle Rubber Co., Inc.

Champion—see Lee Rubber & Tire

Corp., Republic Rubber Div.

Conveyor Co., The

Dayton Rubber Co.

Dodge Manufacturing Corp.

Gates Rubber Co.

**GOODALL RUBBER CO.**

Goodrich Co., B. F., The Industrial

Products Div.

Goodyear Tire & Rubber Co.

**HEWITT-ROBINS, INC.**

INTERNATIONAL B. F. GOOD-  
RICH

Lee Rubber & Tire Corp., Republic

Rubber Div.

**LINK-BELT CO.**

THE MARCY MILL DIV.

Quaker Pioneer Rubber Mills

Quaker Rubber Co.

Raybestos-Manhattan, Inc.

Republic Rubber Div., Lee Rubber

& Tire Corp.

Rhoads & Sons, J. E.

Sealed-Life—see Dodge Mfg. Co.

**TEXROPE—SEE ALLIS-CHAL-  
MERS MFG. CO., INDUS-**

TRIES GROUP

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United States Rubber Co.

United States Rubber Int'l.

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Worthington Corp.

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Watt Car & Wheel Co., The

Yuba Mfg. Co.

Rogers Iron Works  
Sanford-Day Iron Works, Inc.  
Santa Fe Tank Div., Fluor Prods.  
Co.

Saracco Tank & Welding Co.  
Smith Engineering Works

**STEARNS-ROGER MFG. CO.**

**STEPHENS-ADAMSON MFG. CO.**

Straub Mfg. Co.

**STURTEVANT MILL CO.**

Taylor-Wharton Iron & Steel Co.

**TELLURIDE IRON WORKS CO.**

United States Steel Co., Amer.

Bridge Div.

Universal Dredge Mfg. Co.

Universal Engineering Corp.

Wamco—see Washington Machin-

ery Co.

Washington Machinery Co.

Watt Car & Wheel Co., The

Yuba Mfg. Co.

### GATES, LIPS, ETC.

**ALLISON STEEL MFG. CO.**

**AMERICAN BRAKE SHOE CO.,**

AMER. MANGANESE STEEL

DIV.

**AMSCO—SEE AMERICAN BRAKE  
SHOE CO.**

Bodinson Mfg. Co.

Conveyor Co., The

General Elec. Co. of England, Ltd.

Hack Engineering Co.

Hirsch Bros. Machinery Co.

Humboldt, Klockner-Humboldt-

Deutz, A. G.

Klochner-Humboldt-Deutz, A. G.

Koehring Co., Johnson Co., C. S. a

subsidiary.

**LINK-BELT CO.**

Lippmann Engineering Works

McNally Pittsburgh Mfg. Co.

**MINERS FOUNDRY & MFG. CO.**

Taylor-Wharton Iron & Steel Co.

Universal Dredge Mfg. Co.

Wamco—see Washington Machinery

Co.

Washington Machinery Co.

### INDICATORS

Bin-Dicator Co., The

Convair, Inc.

Conveyor Co., The

**DENVER EQUIPMENT CO.**

General Electrical Co. of England,

Ltd.

**HEWITT-ROBINS, INC.**

Hirsch Bros. Machinery Co.

Jeffrey Mfg. Co., The

Koehring Co., Johnson Co., C. S. a

subsidiary.

McNally Pittsburgh Mfg. Co.

**ROBIN TRONIC—SEE HEWITT-  
ROBINS, INC.**

Saracco Tank & Welding Co.

**STEPHENS-ADAMSON MFG. CO.**

TELLEVEL—SEE STEPHENS-

ADAMSON MFG. CO.

**TELLURIDE IRON WKS.**

### VIBRATORS

**BARBER-GREENE CO.**

Bodinson Mfg. Co.

Carrier Conveyor Corp.

Cleveland Vibrator Co., The

Consolidated Pneumatic Tool Co.,

Ltd.

Conveyor Co., The

**DENVER EQUIPMENT CO.**

Erics Mfg. Co.

General Electric Co. Ltd., The

**HEWITT-ROBINS, INC.**

KENNEDY-VAN SAUN MFG. CO.

Lippmann Engineering Works

Rotary Silent—see Martin Engi-

neering Co.

Saracco—see Saracco Tank & Weld-

ing Co.

Saracco Tank & Welding Co.

Sherwin—see General Elec. Co. of

England, Ltd.

**STEPHENS-ADAMSON MFG. CO.**

SYNTRON CO.

**TY-SPEED—SEE TYLER CO.,**

THE W. S.

**TYLER CO., THE W. S.**

Universal Engineering Corp.

**Manufacturer's Complete Names and Ad-  
dresses are listed in Section II, last pages  
of this yellow section. Firms appearing in  
boldface carry advertisements in  
this issue.**

## Brakes

### **BITS**

See also Steel

#### **AUGER BITS**

**ACKER DRILL CO., INC.**  
**AMERICAN BRAKE SHOE CO.**  
 Bowdill Co., The  
 Cardox Corp.  
 Central Mine Equipment Co.  
 Coal Master—see Central Mine  
 Equipment Co.  
 Coeur d'Alene Hardware & Foundry  
 Co.  
 Failing Co., Geo. C.  
 Firth Sterling Inc.  
 Firthite—see Firth Sterling Inc.  
**GARDNER-DENVER CO.**  
 General Electric Co., Carbolooy Dept.  
**KENNAMETAL INC.**  
 Kerfmaster—see Central Mine  
 Equipment Co.  
 Mobile Drilling Inc.  
 Pennsylvania Drilling Co.  
 Salem Tool Co.  
 Thor Power Tool Co.  
 Vascoy-Ramet Corp.

#### **CHURN BITS**

**BUCKYRUS-ERIE CO.**  
 General Electric Co., Carbolooy Dept.  
 Mill Iron Works, Inc.  
 Mobile Drilling, Inc.  
**SPANG & CO.**  
 Westinghouse Air Brake Co., Le  
 Roil Div.

#### **DIAMOND BITS**

**ACKER DRILL CO., INC.**  
 American Coldest Co.  
 Ascolite—Smit & Co., Anton  
**BOYLES BROS. DRILLING CO.**  
**BOYLES BROS. DRILLING CO., LTD.** (CANADA)  
 Bronzolite—see Smit & Co., Inc.,  
 Anton  
 Champion Diamond Co.  
**CHRISTENSEN DIAMOND PRODUCTS CO.**  
 Damco—see Drilling Accessory &  
 Mfg. Co., Inc.  
**DIAMOND TOOL RESEARCH CO., INC.**  
 Drilling Accessory & Mfg. Co., Inc.  
 Failing Co., Geo. C.  
 General Electric Co., Carbolooy Dept.  
 Hard Hed—see Smit & Sons, Inc.,  
 J. K.  
 Havlick, J. L.  
 Hitchcock Mfg. Co., Leo  
 Hoffman Bros. Drilling Co.  
 Impregnalite—see Smit & Co., Inc.,  
 Anton  
**JOY MANUFACTURING CO.**  
 Koebel Diamond Tool Co.  
 Koehelite—see Koebel Diamond Tool  
 Co.  
**LONGYEAR CO., E. J.**  
 McClinton Co., R. S.  
 Metal Carbides Corp.  
 Mobile Drilling Inc.  
 Mott Core Drilling Co.  
 Nicolite—see Smit & Co., Inc.,  
 Anton  
 Pennsylvania Drilling Co.  
**PERMASSET—SEE BOYLES BROS. DRILLING CO., LTD.**  
 Porto Tool Co.  
**ROSET—SEE SPRAGUE & HENWOOD, INC.**  
 Shark Tooth—see American Coldest Corp.  
**SMIT & CO., INC., ANTON**  
 Smit & Sons, Inc., J. K.  
**SPRAGUE & HENWOOD, INC.**  
 Svenska Diamantabgårdernas AB,  
 TELLURIDE IRON WORKS CO.  
**THOR POWER TOOL CO.**  
**TUFSET—SEE SPRAGUE & HENWOOD, INC.**  
**TRUCAST—SEE SPRAGUE & HENWOOD, INC.**  
 Trueo—see Wheel Trueing Tool Co.  
**VAREL DIAMOND PRODUCTS CO.**  
**VAREL MANUFACTURING CO.**  
 Wheel Trueing Tool Co.  
 Winter, Ernst & Son

#### **PERCUSSION BITS**

**ATLAS COPCO EASTERN, INC.**  
**ATLAS COPCO PACIFIC, INC.**  
**ATLAS COPCO, A. B., SWEDEN**  
**BRUNNER & LAY, INC.**  
**BUCKYRUS-ERIE CO.**  
**CARSET—SEE INGERSOLL-RAND CO.**  
 Cleveland Rock Drill Div., Westinghouse Air Brake Co.  
**DEMAG AKTIENGESELLSCHAFT**  
 Firth Sterling, Inc.  
**GARDNER-DENVER CO.**

General Electric Co., Carbolooy Dept.

Hillman Co., Inc., C. Kirk Holman Bros., Ltd., (England)

Holman Brothers (Canada) Ltd.

**INGERSOLL-RAND CO.**

**JOY MANUFACTURING CO.**

Junction Bit & Tool Co.

**KENNAMETAL INC.**

**LIDDCOAT—SEE WESTERN ROCK BIT MFG. CO.**

Manchester Bit Corp.

McCauley Industrial Corp.

Metal Carbides Corp.

Minerals Engineering Co., (Colo.)

Mobile Drilling Inc.

Powermite Drill & Tool Co.

Rip-Bits, Ltd.

**ROK BITS—SEE BRUNNER & LAY INC.**

**SANDVIN COROMANT—SEE ATLAS COPCO PACIFIC, INC.**

Thor Power Tool Co.

Throwaway Bit Corp.

**TIMKEN—SEE TIMKEN ROLLER BEARING CO.**

Timken Roller Bearing Co.

Tungsten Carbides Eng. Co.

Vascoy-Ramet Corp.

**WESTERN ROCK BIT MANUFACTURING CO.**

Westinghouse Air Brake Co., Cleve-

land Rock Drill Div.

Westinghouse Air Brake Co., Le

Roil Div.

#### **ROTARY BITS**

**ACKER DRILL CO., INC.**

**BLUE DEMON—SEE HAWTHORNE, INC., HERB J.**

Central Mine Equipment Co.

**CHICAGO PNEUMATIC TOOL CO.**

Damco—see Drilling Accessory &

Mfg. Co., Inc.

Demo Tool Co.

Drilling Accessory & Mfg. Co., Inc.

Failing Co., Geo.

Firth Sterling, Inc.

Firthite—see Firth Sterling, Inc.

**GARDNER-DENVER CO.**

General Electric Co., Carbolooy Dept.

Hawthorne, Inc., Herb J.

**HITCHCOCK MFG. CO., LEO**

Hoffman Bros. Drilling Co.

**HUGHES TOOL CO.**

Kennametal Inc.

Kerfmaster—see Central Mine

Equipment Co.

**LONGYEAR CO., E. J.**

Mobile Drilling, Inc.

**OIL TOOL MFG. CO.**

Porto Tool Co.

Powermite Drill & Tool Co.

**STANCO MFG. & SALES, INC.**

Stripmater—see Central Mine

Equipment Co.

True Power Tool Co.

**VARLE MFG. CO.**

Vascoy-Ramet Corp.

Westinghouse Air Brake Co., Le

Roil Div.

**WINTER WEISS CO., THE**

#### **BLASTING SUPPLIES**

##### **BLASTING MACHINES**

**ATLAS POWDER CO.**

BC-2 Blaster—see Electro-Technical

Labs.

Coeur d'Alene Hardware & Foundry Co.

**DU PONT DE NEMOURS & CO., E. I., EXPLOSIVES DIV.**

Electro-Technical Labs.

Hercules Powder Co.

Olin Mathieson Chem. Corp., Explosives Div.

SHOT MASTER—SEE ATLAS POWDER CO.

Sly Mfg. Co., W. W., The

Trojan Powder Co.

##### **DETONATING FUSES**

American Cyanamid Co., Organic

Chemicals Div.

**ATLAS POWDER CO.**

Canadian Safety Fuse Co., Ltd.

Coeur d'Alene Hardware & Foundry Co.

**DU PONT DE NEMOURS & CO., E. I., EXPLOSIVES DIV.**

Ensign-Bickford Co.

Hercules Powder Co.

National Fuse & Powder Co.

Olin Mathieson Chem. Corp., Explosives Div.

Plastic Tamping Stick Sales

Primacord—see Ensign-Bickford Co.

Tamping Bag Co., The

Thermalite—see Canadian Safety

Fuse Co., Ltd.

Trojan Powder Co.

**DU PONT DE NEMOURS & CO., E. I., EXPLOSIVES DIV.**

Ensign-Bickford Co., The

Heracles Powder Co.

Olin Mathieson Chem. Corp., Explosives Div.

Primacord—see Canadian Safety

Fuse Co., Ltd.

Trojan Powder Co.

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See also Conveyor Equipment

All Castell—see Vulcan Iron Works (Pa.)

**ALLIS-CHALMERS MFG. CO., INDUSTRIES GROUP, EXPORT DIV.**

**ALLOY STEEL & METALS CO.**

**AMERICAN BRAKE SHOE CO.**

American Hoist & Derrick Co.,

Crosby-Laughlin Div.

**AMCO—SEE AMERICAN BRAKE SHOE CO.**

Bodinson Mfg. Co.

**CARD IRON WORKS CO., THE**

C. S. Crosby Load Rated—see Amer.

Hoist & Derrick

**DEMAG AKTIENGESELLSCHAFT**

Dodge Manufacturing Corp.

**DUROLITE—SEE SAUERMAN BROS., INC.**

**GRIPHOIST, INC.**

**HADFIELDS LTD.**

**HEWITT-ROBINS, INC.**

Hockensmith Corp., The

Jones Foundry & Machine Co., W. A.

**JOY MANUFACTURING CO.**

**KEENEY CO., PAUL E.**

**LAKE SHORE INC.**

**MCLANAHAN & STONE CO.**

**NATL. MALLEABLE & STEEL CASTINGS CO.**

**PACIFIC—SEE ALLOY STEEL & METALS CO.**

Page Engr. Co.

Princeton Gripohost Inc.

**RIBLET TRAMWAY CO.**

**ROPE MASTER—SEE KEENEY CO., PAUL E.**

Sanford-Day Iron Works, Inc.

**SAUERMAN BROS., INC.**

**SKOOKUM CO.**

Taper-Lock—see Dodge Mfg. Co.

Taylor-Wharton Iron & Steel Co.

**TELLURIDE IRON WKS.**

Tool Steel Gear & Pinion Co., The

**VULCAN IRON WKS. (COLORADO)**

**VULCAN IRON WORKS CO.(PA.)**

Washington Iron Wks.

Worthington Corporation

Yube Manufacturing Co.

### **BLOWERS**

See Ventilation Equipment and Blowers

### **BODIES**

See Trucks and Trailers; Mine Cars

### **BOLTS, ROCK**

**BETHLEHEM PACIFIC COAST STEEL CORP.**

Bethlehem Steel Co.

Bethlehem Steel Export Corp.

**CF&I—SEE COLORADO FUEL & IRON CORP., THE**

**COLORADO FUEL & IRON CORP., THE**

Commercial Shearing & Stamping Co., The

Elecro Corp., The

Ohio Brass Co.

Oliver Iron & Steel Corp.

Republic Steel Corp.

**SHEFFIELD STEEL DIV.**

**ARMCO STEEL CORP.**

**TELLURIDE IRON WKS.**

U. S. Industries Inc.

U. S. Steel Corp.—Tennessee Coal & Iron Div.

United States Steel Export Co.

Youngstown Sheet & Tube Co., The

### **BOOM ASSEMBLIES**

See Drills; Excavators and Attachments

### **BRAKES**

**DRUMS AND MECHANISMS LINING**

See Friction Material

**Manufacturer's Complete Names and Addresses are listed in Section II, last pages of this yellow section. Firms appearing in boldface caps carry advertisements in this issue.**

## Brushes, Electrical

### BRUSHES, ELECTRICAL

See Electrical Equipment

### BUCKETS

See also Hoisting Equipment; Tramways, Aerial; Dredges and Dredge Buckets; Conveyor Equipment

#### DRAGLINE BUCKETS

AMERICAN BRAKE SHOE CO., AMER. MANGANESE STEEL DIV.  
AMSCO—SEE AMERICAN BRAKE SHOE CO.  
BUCYRUS-ERIE CO.  
CRESCENT—SEE SAUERMAN BROS., INC.  
ELECTRIC STEEL FOUNDRY  
ESCO—SEE ELECTRIC STEEL FOUNDRY  
Page Engr. Co.  
Pettibone Muliken Corp.  
RED ARCH—SEE BUCYRUS-ERIE CO.  
SAUERMAN BROS., INC.  
Taylor-Wharton Iron & Steel Co.

#### GRAB BUCKETS

Blaw-Knox Co., Blaw-Knox Div.  
Haiss Mfg. Co., Geo.  
HARNISCHFEGER CORP.  
Koehring Co.  
Link Belt Speeder Corp.  
Owen Bucket Co.

#### POWER SHOVEL DIPPERS

AMERICAN BRAKE SHOE CO., AMER. MANGANESE STEEL DIV.  
AMSCO—SEE AMERICAN BRAKE SHOE CO.  
BUCYRUS-ERIE CO.  
ELECTRIC STEEL FOUNDRY  
ESCO—SEE ELECTRIC STEEL FOUNDRY  
Pettibone Muliken Corp.  
Taylor-Wharton Iron & Steel Co.

### BUILDINGS,

### PREFABRICATED

ALLISON STEEL MFG. CO.  
Aluminum Co. of America  
Armeo Drainage & Metal Products, Inc.  
BETHLEHEM PACIFIC COAST STEEL CORP.  
Bethlehem Steel Co.  
Black, Sivals & Bryson, Inc.  
Blaw-Knox Co., Blaw-Knox Div.  
Butler Manufacturing Co.  
COLUMBIAN STEEL TANK CO.  
Republic Steel Corp., Truscon Steel Div.  
Sousé Steel Co.  
Truscon—see Republic Steel Corp.  
U. S. Steel Corp., American Bridge Div.  
UNITED STATES STEEL EXPORT CO.

### BULLDOZERS

See Tractors and Attachments

### BURNERS, OIL & GAS

BABCOCK & WILCOX CO., THE DFC—SEE DENVER FIRE CLAY CO., THE DENVER FIRE CLAY CO., THE GENERAL MOTORS OVERSEAS OPERATIONS  
Iron Fire Clay Co.  
KENNEDY-VAN SAUN MFG. & ENG. CORP.  
MINE & SMELTER SUPPLY CO.  
National Airoil Burner Co.  
Surface Combustion Corp.

### BUYERS OF ORES AND CONCENTRATES

See "Possible Markets Ores, Metals and Non-metallics" elsewhere in this edition

### CABLE AND CONDUIT

See also Rope, Wire; Tramway, Aerial

#### ELECTRICAL CABLE AND CONDUIT

Alphaduct Wire & Cable Co.  
Aluminum Co. of America  
ANACONDA WIRE AND CABLE CO.  
Ankoseal—The Ansonia Wire & Cable Company  
Ansonia Wire & Cable Company  
The BETHLEHEM PACIFIC COAST STEEL CORP.  
British Insulate Callender Cables, Ltd.  
Buckeye—see Youngstown Sheet & Tube Co.  
C M G Industries  
Canada Wire & Cable Co., Ltd.  
Carlton Prod. Corp.  
Carol Cable Co.  
Chase Brass & Copper Co.  
Circle Wire & Cable Corp.  
Collyer Insulated Wire Co.  
Electriduct—see CMG Industries  
Essex Wire Corp.  
Flex-A-Power—see General Electric Co.

#### GENERAL CABLE CORP

General Electric Co.  
General Electric Co., Construction Materials Dept.  
General Electric Co. of England, Ltd.  
GRAYBAR ELECTRIC CO., INC.  
Hazard—see Okonite Co.  
Hazard Insulated Wire Wks.  
International General Electric Co.  
Johns-Manville Sales Corp.  
Korduct—see Johns-Manville Corp.  
Lowell Insulated Wire Corp.  
MINE & SMELTER SUPPLY CO., THE MARCY MILL DIVISION  
Minnesota Mining & Mfg. Co., Irvington Varnish & Insulator Division

Mosebach Electric & Supply Co.

National Supply Co., The

OKONITE COMPANY, HAZARD INSULATED WIRE WORKS  
Paranite—see Essex Wire Corp.  
Paranite Wire and Cable Div.  
Phelps Dodge Copper Products Corp.

ROEBLING'S SONS CORP., JOHN A

Rome Cable Corp.  
Rome 60—see Rome Cable Corp.  
Siemens & Halske A. G.

SIMPLEX WIRE & CABLE CO.

Span—see National Supply Co.

The TIGER BRAND—SEE U. S. STEEL EXPORT CO.

Transite—see Johns-Manville Sales Corp.

United States Rubber Co.

U. S. STEEL CORP., AMERICAN STEEL & WIRE DIV.

United States Steel Corp., Columbia Geneva Steel Div.

UNITED STATES STEEL EXPORT CO.

Western Insulated Wire Co.

Youngstown Sheet & Tube Co., The

### CABLEWAYS, EXCAVATING

See Excavators

### CAGES

See Hoisting Equipment

### CALCINERS

See Dryers and Kilns; Pyrometallurgical Equipment

**Manufacturer's Complete Names and Addresses are listed in Section II, last pages of this yellow section. Firms appearing in boldface caps carry advertisements in this issue.**

### CAPS

See Blasting Supplies

### CARBIDE

CALCIUM—See also Tungsten Carbide Products

Air Reduction Sales Co.  
INDUSTRIAL AIR PRODUCTS CO.  
Monsanto Chemical Co.  
National Carbide Co.  
National Cylinder Gas Co.  
Shawinigan Prod. Corp.  
Union Carbide & Carbon Corp.—Linde Air Products Co.

### CARS, MINE

See also Haulage Units, Off-roads

A C F Industries, Inc. American Car & Foundry Div.  
ALLISON STEEL MFG. CO.  
ATLAS CAR & MFG. CO., THE BALDWIN - LIMA - HAMILTON CORP.

BETHLEHEM PACIFIC COAST STEEL CORP.

Bethlehem Steel Co.  
Bethlehem Steel Export Corp.  
Bischoff-Werke K. G.

CARD IRON WORKS CO., THE, C. S.  
Coeur d'Alene Hardware & Foundry Co.

DART TRUCK CO.

Differential Steel Car Co.  
Easton Car & Construction Co.  
GETMAN BROS. MFG. DIV., INC.

Gregg Co., Ltd. The Hirach Bros. Machinery Co.  
Hockersmith Corp. The Hudson, Robert, Ltd.  
Irwin Foundry & Mine Car Co.  
Kaiser Steel Corp.

LAKE SHORE INC.

Landis Steel Co.  
LOHED—SEE LAKE SHORE, INC.

Magor Car Corp.

MAYO TUNNEL & MINE EQUIP.  
MINERS FOUNDRY & MFG. CO.  
NC-1—SEE NATIONAL MALLEABLE & STEEL CASTINGS CO.

NATIONAL IRON CO.

NATIONAL MALLEABLE & STEEL CASTINGS CO.

Ogden Iron Works Co.  
Pacific Car & Foundry Co.  
Sanford-Day Iron Works Co.

SCOOT-CRETE ORE CARRIER—SEE GETMAN BROS. MFG. DIV., INC.

SELLURIDE IRON WORKS

Union Iron Works, U. S. Industries, Inc.

U. S. INDUSTRIES, INC. IRON WORKS

UNITED STATES STEEL CORP.—AMERICAN BRIDGE DIV.

U. S. Steel Corp., Columbia Geneva Steel Div.

UNITED STATES STEEL CORPORATION

U. S. S.—SEE UNITED STATES STEEL CORPORATION

UNITED STATES STEEL EXPORT CO.

Watt Car & Wheel Co., The Westinghouse Air Brake Co., L. E. Roti Div.

AXELS, WHEELS AND TRUCKS

See above

### CAR PASSERS

AMERICAN MINE DOOR COMPANY

CANTON—SEE AMERICAN MINE DOOR COMPANY

CARD IRON WKS.

MAYO TUNNEL & MINE EQUIP.

MINERS FOUNDRY & MFG. CO.

SELLURIDE IRON WORKS CO.

### CAR SHAKERS

See Shakers, Car

### CELLS, FLOTATION

See Flotation Machines

### CHAIN AND ACCESSORIES

AMERICAN BRAKE SHOE CO., AMER. MANGANESE STEEL DIV.

American Chain & Cable Co., Inc.  
American Chain Div.

Amer. Hoist & Derrick Co., Crosby-Loughlin Div.

AMSCO—SEE AMERICAN BRAKE SHOE CO.

Bowdill Co., The Chain Belt Co., The

ELECTRIC STEEL FOUNDRY CO.

JEFFREY MANUFACTURING CO.  
Loughlin—see Amer. Hoist & Derrick Co.

Loughlin Co., The Thomas Link-Belt Co.

NATIONAL MALLEABLE & STEEL CASTINGS CO.

Ohio Gear Co., The Page Engr. Co.

Republic Steel Corp.

Rex—see Chain Belt Co., The Ryerson & Son, Inc., Joseph T.

STEPHENS-ADAMSON MFG. CO.

Taylor-Wharton Iron & Steel Co.

Thiele, August G.m.b.H.

Tisco—see Taylor-Wharton Iron & Steel Co.

Thomas Laughlin Div., American Hoist & Derrick Co.

Wilmot Engineering Co.

### CHAIN HOISTS

ALLISON STEEL MFG. CO.  
American Chain & Cable Co., Wright Hoist Div.

ATLAS COPCO AB, SWEDEN

CHICAGO PNEUMATIC TOOL CO.

Coffing Hoist Div., Duff-Norton Co.

GRAYBAR ELECTRIC CO., INC.

HARNISCHFEGER CORP.

International Combustion (Export) Ltd.

Loadking—see Yale & Towne Mfg. Co.

R & M—see Robbins & Myers, Inc.

Republic Steel Corp.

Robbins & Myers, Inc.

Yale and Towne Mfg. Co.

### CHARGERS, BATTERY

ELECTRIC STORAGE BATTERY CO., THE EXIDE INDUSTRIAL DIV.

Fairbanks, Morse & Co.

General Electric Co., Apparatus Sales Div.

GOODMAN MANUFACTURING COMPANY, MANCHA STORAGE BATTERY LOCOMOTIVE DIV.

Gould-National Batteries, Inc.

GRAYBAR ELECTRIC CO., INC.

GREENSBURG MACH. CO.

Hobart Bros. Co.

International General Electric Co.

Kohler Co.

Lincoln-Electric Co.

Lister-Blackstone, Inc.

Lynn Engr. Supply Co.

Lyncoe Powerhouse—see Lynn Engr. & Supply Co.

Motor Generator Corp.

Onan & Sons, Inc., D. W.

"Precision-shaft"—see Lincoln Electric Co.

Sperry Co., R. H.

SYNTRON CO.

Ward Leonard Electric Co.

WESTINGHOUSE ELECTRIC INTERNATIONAL CO.

Westinghouse Electric Corp.

### CHEMICAL CONCENTRATORS

See Concentrating Equipment

## Concentrating Equipment

### CHEMICALS

See Reagents and Chemicals

### CHIMNEYS

Consolidated Chimney Co.

**HEAD WRIGHTSON, STOCKTON FORGE LTD.**

### CHUTES

See Bins, Chutes and Accessories; Feeders

### CLAMPS

See Couplings, hose; Rope, Wire

### CLARIFIERS

See Filters, Concentrate; Thickeners and Tanks

### CLASSIFIERS

See also Cyclones

#### AIR

Combustion Engineering Inc., Raymond Div.

Gayco-Reliance—see Universal Road Mach Co.

General Elec. Co. of England, Ltd.

**HARDINGE CO., INC.**

Humboldt, Klockner-Humboldt-

Deutz, A. G.

International Combustion Ltd.

International Engr. Inc.

**KENNEDY-VAN SAUN MFG. & ENGR. CORP.**

Klockner-Humboldt-Deutz A. G.

Loesche, Germany

McNally Pittsburgh Mfg. Co.

Osborne Pulver-cone—see Osborne Lab., Inc.

Roberts & Schaefer

Scott's Concentrators

**STURTEVANT MILL CO.**

Universal Road Machinery Co.

Williams Patent Crusher & Pulverizer Co.

#### HYDRAULIC

**AKINS—SEE MINE & SMOLETER SUPPLY CO. THE**

**CONCENCO—SEE DEISTER CONCENTRATOR CO. THE**

**DEISTER CONCENTRATOR CO. THE**

Deister Machine Co.

**DENVER EQUIPMENT CO.**

**DORR OLIVER, INC.**

Dresser Stacey Co.

Dunham Mfg. & Sales Co., Gordon S

Eagle Iron Works

**EQUIPMENT ENGINEERS INC.**

Fraser & Chalmers Engr. Wks.

General Electric Co. of England, Ltd.

Georgia Iron Wks.

Gibson, W. W.

**HARDINGE CO., INC.**

Heyl & Patterson, Inc.

**KENNEDY-VAN SAUN MFG. & ENGR.**

Klockner-Humboldt-Deutz A. G.

Knapp & Bates, Ltd.

**KREBS—SEE EQUIPMENT ENG. INC.**

McNally Pittsburgh Mfg. Co.

**MINE & SMOLETER SUPPLY CO. THE**

Smith Engineering Works

**TELLURIDE IRON WORKS CO.**

**WEMCO—SEE WESTERN MACH. CO.**

WESTERN MACH. CO.

Wilmot Engineering Co.

#### MECHANICAL

**AKINS—SEE COLORADO IRON WORKS CO. & HEAD WRIGHTSON, STOCKTON FORGE, LTD.**

Bird Machine Co.

Bodinson Mfg. Co.

Bush Engineering & Mfg. Co.

**COLORADO IRON WORKS CO.**

**DENVER EQUIPMENT CO.**

**DORR OLIVER, INC.**

Eagle Iron Works

Fraser & Chalmers Engr. Wks.

General Electric Co. Ltd., The

**HARDINGE CO., INC.**

### HEAD WRIGHTSON, STOCKTON FORGE LTD.

Humboldt, Klockner-Humboldt-Deutz, A. G.

Iowa Mfg. Co.

**KENNEDY-VAN SAUN MFG. & ENGR. CORP.**

Klockner-Humboldt-Deutz A. G.

Knapp & Bates Ltd.

**LINK-BELT CO.**

Lippmann Engineering Works

Magnetic Engineering & Mfg. Co.

**MINE & SMOLETER SUPPLY CO.**

**THE MARCY MILL DIV.**

Miners Foundry & Mfg. Co.

**MORSE BROS. MACHINERY CO.**

Roberts & Schaefer Co.

Smith Engineering Works

**SOUTHWESTERN ENGINEERING CO.**

Straub Mfg. Co., Inc.

**STURTEVANT MILL CO.**

T. & R.—see Bush Eng. & Mfg. Co.

**TRULINE—SEE MORSE BROS. MACHINERY CO.**

Union Iron Works

**WEMCO—SEE WESTERN MACHINERY CO.**

WESTERN MACHINERY CO.

### CLEANERS

See Filters; Scrubbers

### CLOTH

See Filter Media; Screens, Grizzlies and Accessories, Ventilation Equipment

### CLOTHING

See Safety Equipment

### CLUTCHES

#### MECHANISMS

Air-Grip (see Dodge Mfg. Co.)

Cutter-Hammer, Inc.

Diamond-D, (see Dodge Mfg. Co.)

Dodge Mfg. Co.

Eaton Mfg. Co. Dynamatic Div.

**LINK-BELT CO., EXPORT DIV.**

Mariand One-Way Clutch Co.

Morse Chain Co.

Rolling-Grip—see Dodge Mfg. Co.

STEPHENS-ADAMSON MFG. CO.

Twin Disc Clutch Co.

#### FACING & LINING

See Friction Material

### COLLECTORS

See Dust Collection Equipment; Reagents and Chemicals

### COLUMNS

See Arms and Posts

### COMMUNICATIONS

#### BELL AND BUZZER SYSTEMS

Adaptabel—see Edwards Co., Inc.

Adaptahorn—see Edwards Co., Inc.

Connecticut Telephone & Electric Corp.

Edwards Co., Inc.

General Electric Co. of England, Ltd.

**GRAYBAR ELECTRIC CO., INC.**

Lunger—see Edwards Co., Inc.

Stephens-Adamson Mfg. Co.

United States Instrument Corp.

#### MINE TELEPHONES

Connecticut Telephone & Electric Corp.

### EDWARDS CO., INC.

General Electric Co. of England, Ltd.

**GRAYBAR ELECTRIC CO., INC.**

MINE SAFETY APPLIANCES CO.

**SIMPLEX WIRE & CABLE CO.**

Sound Power, see United States Instru-

ment Corp.

Sterling Siren Fire Alarm Co., Inc.

United States Instrument Corp.

### RADIO SYSTEMS

Alpine Laboratories, Ltd.

Connecticut Telephone & Electric Corp.

Fleetway—see Connecticut Tele-

phone & Electric Corp.

General Electric Co. of England,

Ltd.

**GRAYBAR ELECTRIC CO., INC.**

Hycon Aerial Surveys, Inc.

**INTERNATIONAL GENERAL ELECTRIC CO.**

International Geophysics, Inc.

**MINE SAFETY APPLIANCES CO.**

Motorola Communications & Elec-

tronics, Inc.

Sterling Siren Fire Alarm Co., Inc.

**WESTINGHOUSE ELECTRIC IN-**

**TERNATIONAL CO.**

### TROLLEY TELEPHONES

MINE SAFETY APPLIANCES CO.

Sterling Siren Fire Alarm Co., Inc.

### COMPRESSORS &

#### ACCESSORIES

#### PORTABLE

### DEMAG AKTIENGESELLSCHAFT GARDNER-DENVER CO.

General Electric Co. of England, Ltd.

Holman Bros., Ltd. (England)

Holman Brothers (Canada) Limited

**INGERSOLL-RAND CO.**

Jaeger Machine Co., The

**JOY MANUFACTURING CO.**

Lima Electric Motor Co. The

Olin Mathiesen Chem. Corp., Explosives Div.

**RO-FLO—SEE ALLIS-CHAL-**

**MERS MFG. CO., INDUS-**

**TRIES GROUP**

Roots-Connersville Blower Corp.

Schramm Inc.

Spiraxial—see Roots-Connersville

Blower

Techn. Ind. en Handelsonderning

Wedag A.G.

Westinghouse Air Brake Co., Le

Roi Div.

Worthington Corp.

### CONCENTRATING EQUIPMENT

See also Classifiers; Flotation Machines, Magnetic Equipment

#### HEAVY MEDIA SEPARATION

**AKINS—SEE MINE & SMOLETER SUPPLY CO. THE**

**ATKINS—SEE COLORADO IRON WORKS CO.**

**ALLIS-CHALMERS MFG. CO., IN-**

**DUSTRIES GROUP**

**COLORADO IRON WORKS CO.**

Dings Magnetic Separator Co.

**RAVO CORP.**

Filter Fabrics, Inc.

Frazer & Chalmers Engr. Wks.

General Electric Co., Ltd., The

**HARDINGE CO., INC.**

**HEAD WRIGHTSON, STOCKTON FORGE LTD.**

**HEWITT-ROBINS, INC.**

Humboldt, Klockner-Humboldt-

Deutz, A. G.

**JEFFREY MANUFACTURING CO.**

**KENNEDY-VAN SAUN MFG. & ENGR. CORP.**

Klockner-Humboldt-Deutz A. G.

**LINK-BELT CO.**

Magnetic Engineering & Mfg. Co.

Memo—see Magnetic Engineering & Mfg. Co.

**MINE & SMOLETER SUPPLY CO.**

**MORSE BROS. MACH. CO.**

**O. C.—SEE ORE & CHEMICAL CO.**

**ORE & CHEMICAL CO.**

Rapid Magnetic Machines, Ltd.

Simplicity Engineering Co.

Southwestern Eng'r. Co.

Searns Magnetic, Inc.

Power-Vane—see Consolidated Pneumatic Tool Co., Ltd.

Powermite Drill & Tool Co.

Schramm Inc.

UNTAIR—**SEE JOY MANUFAC-**

**TURING CO.**

Westinghouse Air Brake Co., Le

Roi Div.

Westinghouse Air Brake Co. (Pa.)

Worthington Corp.

#### FANNING

Carpco Mfg. Co.

**ION EXCHANGE EQUIPMENT**

**ALLIS-CHALMERS MFG. CO., IN-**

**DUSTRIES GROUP**

**DENVER EQUIPMENT CO.**

**DORR-OLIVER CO.**

**INFILCO, INC.**

Peterson Filters & Engineering Co.

**SOUTHWESTERN ENGINEERING CO.**

Standard Steel Corp.

**STEARNS-ROGER MFG. CO.**

TYLER CO., W. S.

Universal Dredge Mfg. Co.

**WESTERN MACHINERY CO.**

#### JIGS

Bavaria Maschinenfabrik

Bendelari, F. N.

Bodinson Mfg. Co.

Coeur d'Alene Hardware & Foundry Co.

**DENVER EQUIPMENT CO.**

Fraser & Chalmers Engr. Wks.

General Electric Co. Ltd., The

Hirsch Bros. Machy. Co.

Humboldt, Klockner-Humboldt-

Deutz, A. G.

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## Concreting Equipment, Underground

I. H. C. Holland  
James Equipment Inc.  
**JEFFREY MANUFACTURING CO.**  
"Jimmie"—see James Equipment,  
Inc.

**KENNEDY-VAN SAUN MFG. CO.**  
Knapp & Bates, Ltd.  
Klockner-Humboldt-Deutz A. G.  
Krupp, Fried-Maschinen und  
Stahlbau Rheinhausen  
**LINK-BELT CO.**  
McLanahan & Stone Corp.  
McNally Pittsburgh Mfg. Co.  
**MINE & SMELTER SUPPLY CO.**  
MINERS FOUNDRY & MFG. CO.  
**MORSE BROS. MACHINERY CO.**  
Osborne Laboratories, Inc., Ray-  
mond G.  
Universal Dredge Mfg. Co.  
**WEMCO-REMER—SEE WESTERN**  
**MACHY. CO.**  
**WESTERN MACHY. CO.**  
Wilmot Eng. Co.  
Yuba Mfg. Div.

**SPIRAL CONCENTRATORS**  
**DENVER EQUIPMENT CO.**  
Fraser & Chalmers Engr. Wks.  
General Electric Co., Ltd., The  
**HUMPHREYS INVESTMENT CO.**  
Jeffrey Mfg. Co.

### TABLES

Bavaria Maschinenfabrik  
**BUCKMAN TILING CONCENTRATOR—SEE DENVER EQUIP. CO.**  
**CONCENCÖ—SEE DEISTER CONCENTRATOR CO.**  
DEISTERPLAT-O—SEE DEISTER CONCENTRATOR CO.  
**DEISTER CONCENTRATOR CO.**  
Deister Machine Co.  
**DENVER EQUIPMENT CO.**  
DUNHAM MFG. & SALES CO.,  
GORDON S.  
Fraser & Chalmers Engr. Wks.  
General Electric Co. of England,  
Ltd.  
Gibson, W. W.  
Humboldt, Klockner-Humboldt-  
Deutz, A. G.  
James Equipment, Inc.  
Klockner-Humboldt-Deutz, A. G.  
Knapp & Bates, Ltd.  
**LINK-BELT CO.—EXPORT DIV.**  
**MINE & SMELTER SUPPLY CO.**  
Minerals et Metaux  
**MORSE BROS. MACHINERY CO.**  
Osborne Laboratories, Inc., Ray-  
mond G.  
Roberts & Schaefer Co.  
Scott's Concentrators  
Snyder Mine & Chemical Lab.  
Strabag Mfg. Co., Inc.  
**SUPER-DUTY DIAGONAL-DECK**  
—SEE DEISTER CONCENTRATOR CO.  
Universal Dredge Mfg. Co.  
**WILFLEY—SEE MINE & SMELTER SUPPLY CO. THE**  
Yuba Manufacturing Co.

**CHEMICAL CONCENTRATORS**  
Drillard Co., Howard  
Humboldt, Klockner-Humboldt-  
Deutz, A. G.  
**INFILCO, INC.**  
**KENNEDY-VAN SAUN MFG. & CO.**  
Klockner-Humboldt-Deutz, A. G.  
Knapp & Bates, Ltd.  
Snyder Mine & Chemical Lab.  
**STEARNS—ROGER MFG. CO.**  
WESTERN MACHY. CO.

## CONCRETING EQUIPMENT, UNDERGROUND

**See also Grouting, Pneumatic Concrete Placing**  
Air Placement Equip. Co.  
Airplace—see Air Placement Equip.  
Co.  
Blaw-Knox Co.  
Bondactor—see Air Placement Equip. Co.  
**CEMENT GUN CO.**  
Cementation Co. Ltd., The  
Chain Belt Co.  
**CHICAGO PNEUMATIC TOOL CO.**  
Construction Mach. Co.  
Grout or Blast—see Air Placement Equip. Co.  
**GUNITE—SEE CEMENT GUN CO.**  
Jaeger Machine Co., The  
**MAYO TUNNEL & MINE EQUIP.**  
Mix-elevator—see Air Placement Equip. Co.

Nucrutor—see Air Placement Equip. Co.  
Rex—see Chain Belt Co.  
Torkret G.m.b.H.

## CONDITIONERS

**See Agitators and Conditioners**

## CONDUIT

**See Cable and Conduit**

## CONSTRUCTION,

### MINE PLANT

**See Plant Design and Construction**

## CONSULTING

### METALLURGICAL ENGINEERS

Hasen, H. L.  
Keegel, C. P.  
Krebs, Kellogg  
Talbot, H. L.

## CONSULTING MINING ENGINEERS AND SERVICES

Alderman, Jr., Sidney S.  
**BAILEY & VARN HORN**  
Baukhol, Philip J.  
**CHAPMAN, WOOD & GRISWOLD**  
COWIN & CO., INC.  
**DALE, WADE M.**  
Davis & Davis  
**EAKLAND & OSTERSTOCK**  
Earle, Norton K.  
**FREDERICK, FRANCIS H.**  
Gardner, E. D.  
Geo-Engineering  
Geo-Professional Services, Inc.  
**GOULD & CO., GORDON I.**  
Ingersoll, Guy E.  
Johnson, Herbert Banks  
**KANE, WM. G.**  
Keegel, C. P.  
Lintz, Mark  
**LONGY CO., E. J.**  
Loofbourou, R. L.  
MacAfee & Co.  
**MCMILLAN, F. W.**  
**MEISSNER ENGRG. INC., J. F.**  
Miller, Arnold H.  
Mineral Engineering Co. (Calif.)  
**O'KEEFE, JOHN J.**  
**PENA ASSOCIATES**  
Pierce, Roger V.  
**PIGGOTT PROJECTS**  
Pigott, Allen W.  
**SCHAFFER & ASSOCIATES, F. C.**  
**SCHEIDENHELM, F. W.**  
Smerchanski, Mark G.  
Schroter & Lockwood  
Shedwick, Jr., Wm. J.  
Sherman, Howard P.  
**STILL & STILL**  
**THOMAS, CONRAD W.**  
**TURNER & ASSOCIATES**  
Uranium Exploration  
Willfley, C. R.  
**WISNER & COX**  
Harry J. Wolf  
**WILSON EXPLORATION CO.**  
World Mining Consultants Inc.

## CONTINUOUS MINERS

Goodman Mfg. Co.  
**JEFFREY MFG. CO.**  
**JOY MFG. CO.**  
National Mine Service Co.

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Scott's Concentrators  
Westinghouse Air Brake Co., La  
Roi Div.

## CONTROL EQUIPMENT

**See Testing, Recording, and Control Equipment**

## CONVERTERS

**See Electrical Equipment; Pyrometallurgical Equipment, Transmissions**

## CONVEYOR EQUIPMENT

**See also Scales and Feeders**

### BELTS

**AMERICAN BRAKE SHOE CO.**  
American Rubber Mfg. Co.  
**AMSCO—SEE AMERICAN BRAKE SHOE CO.**  
**BARBER-GREENE CO.**  
Bear—see American Rubber Co.  
Becker-Prunte, G.m.b.H.  
Bischoff-Werke K. G.  
Bodinson Mfg. Co.  
Bonded Scale & Machine Co.  
Boston Woven Hose & Rubber Co.  
Carlyle Rubber Co., Inc.  
Chain Belt Co.  
Continental Gin Co.  
Conveyor Co., The  
Crackerjack—see American Rubber Co.

**DEMAG AKTIENGESELLSCHAFT**  
Eickhoff, Gebr. Maschinenfabrik A.

Eiseneggierei G.m.b.H.  
**EQUIPMENT ENG. INC.**

Gates Rubber Co.  
**GOODALL RUBBER CO.**

Goodrich Rubber Co.

Goodrich Co. B. F., Industrial Prod. Div.

Goodyear Tire & Rubber Co.

Gruendler Crusher & Pulverizer Co.

**HACK ENG. CO.**

Haisa Mfg. Co., Inc., Geo.

**HEWITT-ROBINS INC.**

Homocord—see Raybestos-Manhattan, Inc.

**INTERNATIONAL B. F. GOODRICH**

International Combustion (Export) Ltd.

Iowa Manufacturing Co.

**KENNEDY-VAN SAUN MFG. & ENG. CORP.**

Klockner-Humboldt-Deutz, A. G., Korb-Pettit Wire Fabrics & Iron Wks., Inc.

Lee Rubber & Tire Corp., Republic Rubber Div.

**LINK-BELT CO.**

Magnetic Engineering & Mfg. Co.

**MAYO TUNNEL & MINE EQUIPMENT**

McNally Pittsburgh Mfg. Co.

**MINE & SMELTER SUPPLY CO., THE MARCY MILL DIV.**

National Mine Service Co.

Ogden Iron Works Co.

Pohlig, J. A. G.

Porter Co., H. K., Quaker Rubber Co. Div.

Quaker Pioneer Rubber Mills

Quaker Rubber Co.—see Porter Co., H. K.

Raybestos-Manhattan, Inc.

Rayman—see Raybestos-Manhattan Co.

Record-Maker—see Lee Rubber & Tire Corp., Republic Rubber Div.

Republic Rubber Div., Lee Rubber & Tire Corp.

Rex—see Chain Belt Co.

Richardson Scale Co.

Smith Engineering Works

Sprout, Waldron & Co., Inc.

**STEPHENS-ADAMSON MFG. CO.**

Stubbe, Albert

Super Excels—see Lee Rubber & Tire Corp., Republic Rubber Div.

Taylor-Wharton Iron & Steel Co.

**TELLURIDE IRON WKS.**

Towbridge—see Magnetic Engineering & Mfg. Co.

**HEWITT-ROBINS INC.**

Iowa Manufacturing Co.

Irwin Foundry & Mine Car Co.

Jeffrey Manufacturing Co.

**JOY MANUFACTURING CO.**

Klockner-Humboldt-Deutz A. G.

**LINK-BELT CO.**

Lippmann Engineering Works

**MINE & SMELTER SUPPLY CO., THE MARCY MILL DIV.**

Ogden Iron Works Co.

Pohlig, J. A. G.

Rex—see Chain Belt Co.

Rogers Iron Works Co.

Skookum Co., Inc., The

Smith Engineering Works

Sprout, Waldron & Co., Inc.

**STEPHENS-ADAMSON MFG. CO.**

Taylor-Wharton Iron & Steel Co.  
**TELLURIDE IRON WKS.**

**HERMOID CO.**

Thiele, August, G.m.b.H.

Thor Power Tool Co.

Treadwell Co., Inc., M. H.

Towbridge—see Magnetic Engineering & Mfg. Co.

Turner Bros. Asbestos Ltd.

United States Rubber Int'l.

**U. S. STEEL EXPORT CO.**

Universal Dredge Mfg. Co.

Universal Engineering Corp.

Western Foundry Co.

Yuba Manufacturing Div.

**Yosemite—see American Rubber Mfg. Co.**

### BUCKETS

**AMERICAN BRAKE SHOE CO.**  
**AMER. MANGANESE STEEL DIV.**

**AMSCO—SEE AMERICAN BRAKE SHOE CO.**

**BARBER-GREENE CO.**

Bodinson Mfg. Co.

Chain Belt Co.

Christian Engineers, J. D.

Columbia Steel Casting Co., Inc.

Continental Gin Co.

Conveyor Co., The

**EQUIPMENT ENG. INC.**

Fa. Tena Pa & Co.

General Electric Co. of England, Ltd.

Gruendler Crusher & Pulverizer Co.

**HACK ENG. CO.**

**HEWITT-ROBINS, INC.**

Iowa Manufacturing Co.

Irwin Foundry & Mine Car Co.

Jeffrey Manufacturing Co.

**KENNEDY-VAN SAUN MFG. & ENG. CORP.**

Klockner-Humboldt-Deutz A. G., a subsid.

**LINK-BELT—SEE LINK-BELT CO.**

**LINK-BELT CO.**

Lippmann Engineering Works

Magnetic Engineering & Mfg. Co.

McDowell Co., Inc.

McNally Pittsburgh Mfg. Co.

**MINE & SMELTER SUPPLY CO., THE MARCY MILL DIV.**

**NATIONAL IRON CO.**

Ogden Iron Works Co.

Owen Bucket Co., The

Pioneer Eng. Div., Poor & Co., Inc.

Rex—see Chain Belt Co.

Rogers Iron Works Co.

Siemens-Tec Co.

Sanford Iron Works, Inc.

Stubble, Albert

Taylor-Wharton Iron & Steel Co.

Towbridge—see Magnetic Engineering & Mfg. Co.

Thik-Lip—see Christian Engineers, J. D.

Universal Dredge Mfg. Co.

Universal Engineering Corp.

Watt Car & Wheel Co., The

Western Foundry Co.

Wilmot Eng'r. Co.

Yuba Manufacturing Div.

### DRIVE AND TAIL PULLEYS

ACF Industries, Inc., American Car & Foundry Div.

**AMERICAN BRAKE SHOE CO.**

**BARBER-GREENE CO.**

Bodinson Mfg. Co.

Bonded Scale and Machine Co.

Chain Belt Co.

Christian Engineers, J. D.

Continental Gin Co.

Conveyor Co., The

**DEMAG AKTIENGESELLSCHAFT**

Dodge Manufacturing Corp.

**EQUIPMENT ENG. INC.**

General Electric Co. Ltd., The

Gruendler Crusher & Pulverized Co.

**HADFIELDS LTD.**

Haisa Mfg. Co., Inc., Geo.

**HEWITT-ROBINS, INC.**

Iowa Manufacturing Co.

Irwin Foundry & Mine Car Co.

Jeffrey Manufacturing Co.

**JOY MANUFACTURING CO.**

Klockner-Humboldt-Deutz A. G.

**LINK-BELT CO.**

Lippmann Engineering Works

**MINE & SMELTER SUPPLY CO., THE MARCY MILL DIV.**

Ogden Iron Works Co.

Pohlig, J. A. G.

Rex—see Chain Belt Co.

Rogers Iron Works Co.

Skookum Co., Inc., The

Smith Engineering Works

Sprout, Waldron & Co., Inc.

**STEPHENS-ADAMSON MFG. CO.**

## Coolers

Stubbe, Albert  
Taper-Lock—see Dodge Mfg. Co.  
Taylor-Wharton Iron & Steel Co.  
**TELLURIDE IRON WORKS CO.**  
Treadwell Co., Inc., M. H.  
Universal Dredge Mfg. Co.  
Universal Engineering Corp.  
Wamsco—see Washington Mach. Co.  
Washington Mach. Co.  
Wedg-Grip—see Christian Engineers, J. D.  
Western Foundry Co.  
Yuba Manufacturing Div.

### IDIERS

**AMERICAN BRAKE SHOE CO.**  
AMERICAN MANGANESE STEEL DIV.  
**AMSCO—SEE AMERICAN BRAKE SHOE CO.**  
**BARBER-GREENE CO.**  
Bodinson Mfg. Co.  
Bonded Scale & Machine Co.  
Bonded Scale & Machine Co.  
British Jeffrey-Diamond Ltd.  
Chain Belt Co.  
Christian Engineers, J. D.  
Continental Gin Co., Industrial Div.  
Conveyor Co., The  
**EQUIPMENT ENG., INC.**  
Fraser & Chalmers Engr. Wks.  
General Electric Co., Ltd., The Goodyear Tire & Rubber Co.  
Gruendler Crusher & Pulverizer Co.  
**HACK ENG. CO.**  
Hains Mfg. Co., Inc., Geo.  
**HEWITT-ROBINS, INC.**  
International Combustion (Export) Ltd.  
Iowa Manufacturing Co.  
Irwin Foundry & Mine Car Co.  
Jeffrey Manufacturing Co.  
**JOY MANUFACTURING CO.**  
**KENNEDY-VAN SAUN MFG. & ENGR. CORP.**  
**LIMBEROLLER—SEE JOY MFG. CO.**  
**LINK-BELT CO.**  
Lippmann Engineering Co., E. F.  
McNally Pittsburgh Mfg. Co.  
**MINE & SMOLETER SUPPLY CO., THE MARCY MILL CO.**  
Ogden Iron Works Co.  
Pettibone Mulliken Corp.  
Pioneer Engineering Div., Poor & Co., Inc.  
Pohlig, J. A. G.  
Rex—see Chain Belt Co.  
Smith Engineering Works  
**STEPHENS-ADAMSON MFG. CO.**  
Stubbe, Albert  
Taylor-Wharton Iron & Steel Co.  
**TELLURIDE IRON WORKS**  
Treadwell Co., Inc., M. H.  
Universal Hack Eng. Co.  
Universal Dredge Mfg. Co.  
Universal Engineering Corp.  
Western Foundry Co.  
Yuba Manufacturing Co.

**PILLOW BLOCKS AND HANGERS**  
**AMERICAN BRAKE SHOE CO.**  
AMERICAN MANGANESE STEEL DIV.  
**AMSCO—SEE AMERICAN BRAKE SHOE CO.**  
Bodinson Mfg. Co.  
Chain Belt Co.  
Christian Engineers, J. D.  
Continental Gin Co., Industrial Div.  
Conveyor Co., The  
Dodge Manufacturing Corp.  
**EQUIPMENT ENG., INC.**  
General Electric Co., Ltd., The Gruendler Crusher & Pulverizer Co.  
**HADFIELDS LTD.**  
Hains Mfg. Co., Inc., Geo.  
**HEWITT-ROBINS, INC.**  
Iowa Manufacturing Co.  
Jeffrey Manufacturing Co.  
**LINK-BELT CO.**  
McNally Pittsburgh Co.  
**MINE & SMOLETER SUPPLY CO., THE MARCY MILL DIV.**  
Ogden Iron Works Co.  
Pettibone Mulliken Corp.  
Pioneer Engineering Div., Poor & Co., Inc.  
Pioneer Rubber Mills  
Porter Co., Inc., H. K., Quaker Rubber Div.  
Quaker Pioneer Rubber Mills  
Quaker Rubber Co.  
Raybestos-Manhattan, Inc.  
**READY-SPAN—SEE JOY MFG. CO.**  
**REDI-FAB, SEE BARBER-GREENE CO.**  
Republic Rubber Div., Lee Rubber & Tire Corp.

## CONVEYORS AND ELEVATORS

### See also Feeders

#### BELT CONVEYORS

**AMERICAN BRAKE SHOE CO.**  
AMERICAN MANGANESE STEEL DIV.  
American Rubber Mfg. Co.  
**AMSCO—SEE AMERICAN BRAKE SHOE CO.**

Athens Products Corp.  
**BARBER-GREENE CO.**  
Bodinson Mfg. Co.  
Bonded Scale & Machine Co.  
British Jeffrey-Diamond Ltd.  
Broadbent, Robert & Son, Ltd.  
Butler Mfg. Co.  
Carlyle Rubber Co., Inc.  
Carpco Mfg. Inc.  
Chain Belt Co.  
Christian Engineers, J. D.  
Continental Gin Co.  
Conveyor Co., The  
Crackerjack—see American Rubber Mfg. Co.

**DEMAG AKTIENGESELLSCHAFT**  
**DENVER EQUIPMENT CO.**  
Diamond Iron Works Div., Good- man Mfg. Co.  
Eickhoff, Gebr. Maschinenfabrik u. Eisengießerei G.m.b.H.  
Equipment Engineering Co.  
Erbo Maschinenbau  
Fraser & Chalmers Engr. Wks.  
Goodall Rubber Co.  
**GOODMAN MANUFACTURING CO.**

**GOODRICH CO., B. F. INDUS-TRIAL PROD. DIV.**  
Gruendler Crusher & Pulverizer Co.

**HACK ENG. CO.**  
Hains Mfg. Co., Inc., Geo.  
Hemshiedt, Hermann Maschinenfabrik

**HEWITT-ROBINS, INC.**  
**HEWITT-ROBINS, INC. ROBINS CONVEYORS DIV.**

Hirsch Bros. Machinery Co.  
Humboldt, Klockner - Humboldt-Deutz, A. G.

**INTERNATIONAL B. F. GOOD-RICH**

International Combustion (Export) Ltd.

Iowa Manufacturing Co.  
Jeffrey Manufacturing Co., The  
**KENNEDY-VAN SAUN MFG. & ENGR. CORP.**

Klockner-Humboldt-Deutz, A. G.  
Koehring Co., Johnson Co., C. S.

LANDIS STEEL CO.

**LINK-BELT CO.**

Lippmann Engineering Works

M-H Standard Corp.

McNally Engineering & Mfg. Co.

McLanahan & Stone

Ogden Iron Works Co.

Pettibone Mulliken Corp.

Pioneer Engineering Div., Poor & Co., Inc.

Roger's Iron Works Co.

Smith Engineering Works

**STEPHENS-ADAMSON MFG. CO.**

STURTEVANT MILL CO.

Taylor-Wharton Iron & Steel Co.

**TELLURIDE IRON WKS.**

Treadwell Co., Inc., M. H.

Trowbridge—see Magnetic Eng.

Engineering & Mfg. Co.

Universal Dredge Mfg. Co.

Universal Engineering Corp.

Washington Machinery Co.

Watt Car & Wheel Co., The

Wilmett Engineering Co.

Yuba Manufacturing Div.

Rex—see Chain Belt Co.  
Rogers Iron Works Co.  
Salzgitter Maschinen Aktiengesell- schaft

Smith Engineering Works

**STEPHENS-ADAMSON MFG. CO.**

**STURTEVANT MILL CO.**

**TELLURIDE IRON WKS.**

Thiele, August G.m.b.H.

**ATHERMOLD CO.**

Treadwell Co., Inc., M. H.

Trowbridge—see Magnetic Eng.

Engineering & Mfg. Co.

United States Rubber Co.

United States Rubber Intl.

**U. S. STEEL EXPORT CO.**

Universal Dredge Mfg. Co.

Universal Engineering Corp.

Washington Machinery Co.

Westfälische Maschinenbau G.m.b.H.

Wood & Co. Ltd., Hugh

Yosemite—see American Rubber Mfg. Co.

**BUCKET ELEVATORS**

**AMERICAN BRAKE SHOE CO.**  
AMERICAN MANGANESE STEEL DIV.

**AMSCO—SEE AMERICAN BRAKE SHOE CO.**

**BARBER-GREENE CO.**

Bodinson Mfg. Co.

Bonded Scale & Machine Co.

Butler Mfg. Co.

Carpco Mfg. Inc.

Chain Belt Co.

Christian Engineers, J. D.

**COLUMBIA STEEL CASTING CO., INC.**

Continental Gin Co., Industrial Div.

Conveyor Co., The

Diamond Iron Works Div., Good-

man Mfg. Co.

Equipment Engineering Co.

General Electric Co. of England, Ltd.

Gruendler Crusher & Pulverizer Co.

**HACK ENG. CO.**

Hirsch Bros. Machinery Co.

Humboldt, Klockner - Humboldt-

Deutz, A. G.

**INTERNATIONAL B. F. GOOD-RICH**

International Combustion (Export) Ltd.

Iowa Manufacturing Co.

Jeffrey Manufacturing Co., The

**KENNEDY-VAN SAUN MFG. & ENGR. CORP.**

Klockner-Humboldt-Deutz, A. G.

Koehring Co., Johnson Co., C. S.

LANDIS STEEL CO.

**LINK-BELT CO.**

Lippmann Engineering Works

M-H Standard Corp.

McNally Engineering & Mfg. Co.

McLanahan & Stone

Ogden Iron Works Co.

Pettibone Mulliken Corp.

Pioneer Engineering Div., Poor &

Co., Inc.

Roger's Iron Works Co.

Smith Engineering Works

**STEPHENS-ADAMSON MFG. CO.**

**STURTEVANT MILL CO.**

Taylor-Wharton Iron & Steel Co.

**TELLURIDE IRON WKS.**

Treadwell Co., Inc., M. H.

Trowbridge—see Magnetic Eng.

Engineering & Mfg. Co.

Universal Dredge Mfg. Co.

Universal Engineering Corp.

Washington Machinery Co.

Watt Car & Wheel Co., The

Wilmett Engineering Co.

Yuba Manufacturing Div.

**Conveyor Co., The**  
Continental Gin Co., Industrial Div.  
Equipment Engineering Co.

Gruendler Crusher & Pulverizer Co.

**HACK ENGINEERING CO.**

Hevi-Edge—see Christian Engineers, J. D.

Hirsch Bros. Machinery Co.

**HOLO-FLITE — SEE WESTERN PRECIPITATION CO.**

Humboldt, Klockner - Humboldt- Deutz, A. G.

**JEFFREY MANUFACTURING CO.**

KENNEDY-VAN SAUN MFG. & ENGR. CORP.

Klockner-Humboldt-Deutz, A. G.

Koehring Co., Johnson Co., C. S.

**LINK-BELT CO.**

Lippmann Engineering Works

M-H Standard Corp.

Miners Foundry & Mfg. Co.

Ogden Iron Works Co.

Pettibone Mulliken Corp.

Pioneer Engineering Div., Poor & Co., Inc.

Rex—see Chain Belt Co.

Richardson Scale Co.

**STEPHENS-ADAMSON MFG. CO.**

**STURTEVANT MILL CO.**

Taylor-Wharton Iron & Steel Co.

**TELLURIDE IRON WKS.**

Universal Dredge Mfg. Co.

Universal Engineering Corp.

Vulcan Iron Works, Inc.

Watt Car & Wheel Co., The

### STEEL CONVEYORS

Westfälische Maschinenbau G.m.b.H.

### SHAKING OR VIBRATING

Bodinson Mfg. Co.

Bonded Scale & Machine Co.

Carpco Mfg. Inc.

Cleveland Vibrator Corp.

Continental Gin Co.

Conveyor Co., The

Fraser & Chalmers

General Electric Co., Ltd., The

**GOODMAN MANUFACTURING CO.**

Gruendler Crusher & Pulverizer Co.

**HACK ENG. CO.**

Haubineco, Maschinenfabrik

**HEWITT-ROBINS, INC.**

Humboldt, Klockner - Humboldt- Deutz, A. G.

Internal Combustion (Export) Ltd.

Jeffrey Manufacturing Co.

**KENNEDY-VAN SAUN MFG. & ENGR. CORP.**

Klockner-Humboldt-Deutz, A. G.

**LINK-BELT CO.**

Lippmann Engineering Works

Simplicity Engr. Co.

Overstrom & Sons

**SMITH & CO., F. L.**

Stahlwerke Brunnhaus G.m.b.H.

**STEPHENS-ADAMSON MFG. CO.**

**SYNTRON CO.**

**TELLURIDE IRON WKS.**

Universal Dredge Mfg. Co.

Universal Engineering Corp.

Vulcan Iron Works, Inc.

Watt Car & Wheel Co., The

### STACKERS

**JEFFERY MFG. CO.**

### PNEUMATIC

Spencer Turbine Co., The

Erie Manufacturing Co.

Flour Hartman, Div. Flour Prod-

ucts Co. Hartman A. G., Mas-

chinenfabrik

U. S. Hoffman Machinery Corp.

### COOLERS

See also Dryers & Kilns

**ALLIS-CHALMERS MFG. CO.**

**AMERICAN BRAKE SHOE CO.**

AMERICAN MANGANESE STEEL DIV.

**AMSCO—SEE AMERICAN BRAKE SHOE CO.**

Bodinson Mfg. Co.

Braun & Co., C. F.

Carrier Conveyor Corp.

Carrier Corp.

Christian Engineers, J. D.

**DAIRO CORP.**

**HARDINGER CO., INC.**

**HEAD WRIGHTSON, STOCKTON FORGE LTD.**

**HOLO-FLITE — SEE WESTERN PRECIPITATION CORP.**

Jeffrey Manufacturing Co.

**KENNEDY-VAN SAUN MFG. & ENGR. CORP.**

Klockner-Humboldt-Deutz A. G.

**LINK-BELT CO.**

**Manufacturer's Complete Names and Addresses are listed in Section II, last pages of this yellow section. Firms appearing in boldface caps carry advertisements in this issue.**

## Coolers, Mine

Nichols Engineering & Research Corp.

NORDBERG MFG. CO.

Ogden Iron Works Co.

PACIFIC FOUNDRY CO., LTD.

Sarracco Tank & Welding Co.

SMITH & CO., F. L.

Standard Steel Corp.

STEARNS ROGER MFG. CO.

Surface Combustion Corp.

TRAYLOR ENGR. & MFG. CO.

Washington Machinery Co.

WESTERN PRECIPITATION CORP.

WINDELER CO., LTD., GEORGE

## COOLERS, MINE

Carrier Corp.

International Engineering, Inc.

## COOLING TOWERS

Carrier Corp.

NATIONAL TANK & PIPE CO.

Ogden Iron Works Co.

Pacific Wood Tank Corp.

Santa Fe Tank Div., Flour Products Co.

WINDELER CO., LTD., GEO.

## CORE BARRELS

ACKER DRILL CO., INC.

American Coldset Corp.

BOYLES BROS. DRILLING CO. LTD. (CANADA)

DIAMOND DRILL CONTRACTING CO.

Hitchens Mfr. Co., Leo

JOY MFG. CO.

Mayhew Supply Co., Inc.

McClintock, R. S.

## COUNTERS, GEIGER, OR SCINTILLATION

See Geiger Scintillation Counters

## COUPLERS, CAR

AUTOMATIC—SEE NATIONAL MALLEABLE & STEEL CASTINGS CO.

CARD IRON WORKS CO., THE C. S.

Coeur d'Alene Hardware & Foundry Co.

Differential Steel Car Co.

Elmo Corp., The

Gregg Co. Ltd., The

Irwin Foundry & Mine Car Co.

MAYO AUTOMATIC—SEE MAYO TUNNEL & MINE EQUIP.

MAYO TUNNEL & MINE EQUIP.

MINERS FOUNDRY & MFG. CO.

NATIONAL MALLEABLE & STEEL CASTINGS CO.

Ohio Brass Co.

Sanford-Day Iron Works Inc.

Umeo—see Utility Mine Equipment Co.

Utility Mine Equipment Co.

WILLISON—SEE NATIONAL MALLEABLE & STEEL CASTINGS CO.

## COUPLINGS

See also Transmissions

### HOSE

ATLAS COPCO AB, SWEDEN

ATLAS COPCO EASTERN, INC.

ATLAS COPCO PACIFIC, INC.

Band-It Co.

Barco Mfg. Co.

Bodinson Mfg. Co.

Boston Woven Hose & Rubber Co.

CHICAGO PNEUMATIC TOOL CO.

CHIKSAN CO.

Cleveland Div., Westinghouse Air Brake Co.

Consolidated Pneumatic Tool Co., Ltd.

Gates Rubber Co.

GOODALL RUBBER CO.

Hose Accessories Co., Le-Hi Div.

Ideal Corp.

INTERNATIONAL B. F. GOODRICH

Le Hi Champ—see Hose Accessories Co.

MINE & SMOLETER SUPPLY CO.

THE MARCY MILL DIV.

Pioneer Rubber Mills

Punch-Loc Co.

Snap-Tite, Inc.

Stewart-Warner Corp.

ATHERMOLD CO.

Thor Power Tool Co.

Trabon Engineering Corp.

U. S. Rubber Int'l.

### PIPE

ATLAS COPCO AB, SWEDEN

ATLAS COPCO PACIFIC, INC.

Band-It Co.

Bethlehem Steel Co.

Bodinson Mfg. Co.

CHIKSAN CO.

Food Machinery & Chem. Corp., John Bean Div.

Goodall Rubber Co.

Grinnell Co., Inc.

Gruvgrip—see Gustin-Bacon Mfg. Co.

Gruvjoint—see Gustin-Bacon Mfg. Co.

Gustin-Bacon Mfg. Co.

Industrial Coupler Co.

INTERNATIONAL B. F. GOODRICH

Johns-Manville Sales Corp.

MANNING CO., CHAS. E.

MINE & SMOLETER SUPPLY CO.

THE MARCY MILL DIV.

National Supply Co. (Pa.)

Pacific Pipe Co.

Porter Co., Inc., H. K., W-S Fittings Div.

Ring-Tite—see Johns-Manville

Rolagrip—see Gustin-Bacon Mfg. Co.

Spang—see National Supply Co. (Pa.)

Taylor Forge & Pipe Works

Thor Power Tool Co.

Vietaulic Co. of America

Walworth Co.

Westinghouse Air Brake Co., Cleve-

land Rock Drill Div.

### SHAFT & SHAFT FLEXIBLE

Airflex—see Falk Corp., The

Bodinson Mfg. Co.

BROWN, INC., DAVID

Chain Belt Co.

Continental Gin Co.

Diamond Chain Co.

Dodge Mfg. Corp.

Falk Corp., The

Farrel-Bacon—see Farrel-Birming-

ham Co., Inc.

Farrel-Birmingham Co., Inc.

Fast's Self-aligning—see Koppers Co. Ind. Metal Prod. Div.

HEWITT-ROBINS, INC.

Jeffrey Manufacturing Co.

Koppers Co., Inc., Metal Prod. Div.

LINK-BELT CO.

Morse Chain Co.

Para-Flex—see Dodge Mfg. Corp.

Philadelphia Gear Wks., Inc.

Philipsen—see Chain Belt Co.

Powerflex—see Falk Corp., The

Taper-Lock—see Dodge Mfg. Co.

Thomas Flexible Coupling Co.

Western Gear Corp. (S. F.)

## CRANES

### BRIDGE

ALLISON STEEL MFG. CO.

American Chain & Cable Co.

Wright Hoist Div.

American Hoist & Derrick Co.

Crosby-Laughlin Div.

Bodinson Mfg. Co.

DEMAG AKTIENGESELLSCHAFT

DRAVO CORP.

EQUIPMENT ENG., INC.

HACK ENGINEERING CO.

HARNISCHFEGER CORP.

Heyl & Patterson, Inc.

Mannesmann Export G.m.b.H.

Ohio Hoist & Mfg. Co.

Pacific Coast Engr. Co.

Pittman Manufacturing Co.

Robbins & Myers, Inc.

Schoenmaker Co., Inc., P. G.

Shepard Niles Crane & Hoist Corp.

STEARNS-ROGER MFG. CO.

Thunes Mek. Verksted, A. S.

UNITED STATES STEEL CORP.

AMERICAN BRIDGES DIV.

Universal Dredge Mfg. Co.

Wellman Engineering Co., The

Yuba Mfg. Div., Yuba Consolidated

Industries, Inc.

### JIB

American Chain & Cable Co.

Wright Hoist Div.

American Hoist & Derrick Co.

Crosby-Laughlin Div.

Austin-Western & Lima A. W.

BALDWIN - LIMA - HAMILTON CORP.

Bodinson Mfg. Co.

Clyde Iron Wks., Inc.

DEMAC AKTIENGESELLSCHAFT

HACK ENGINEERING CO.

HARNISCHFEGER CORP.

LE TOURNEAU-WESTINGHOUSE CO.

Ohio Hoist & Mfg. Co.

Shepard Niles Crane & Hoist Corp.

Thunes Mek. Verksted, A. S.

Universal Dredge Mfg. Co.

Yuba Mfg. Div.

### TRUCK or TRACTOR MOUNTED

ALLIS-CHALMERS MFG. CO.

CONST. MACHY. DIV.

American Hoist & Derrick Co.

Augsburg-Nürnberg AG, Mas-

chinenfabrik (M.A.N.)

BALDWIN-LIMA-HAMILTON

CORP.

Bay City Shovels, Inc.

BUCKNER ERIC CO.

CLARK EQUIP. CO., CONSTRUC-

TION MACH. DIV.

Clyde Iron Wks., Inc.

Crane Mobile—see Bay City Shovels,

Inc.

DEMAG AKTIENGESELLSCHAFT

Four Wheel Drive Auto Co., The

Garwood Industries, Inc.

HARNISCHFEGER CORP.

HIAB—SEE STANCO MFG. &

SALES, INC.

HYDROCRANE—SEE BUCYRUS-

ERIE CO.

Hyster Co.

INTERNATIONAL HARVESTER

EXPORT CO.

INTERNATIONAL SUPERIOR—

SEE INTERNATIONAL HAR-

VESTER EXPORT CO.

KOEHRING CO.

LE TOURNEAU-WESTINGHOUSE

ERIE CO.

Link Belt Speeder Corp.

LIMA—SEE BALDWIN-LIMA-

HAMILTON CORP.

LORAIN—see Thew Shovel Co.

MANITOWOC ENG. CORP.

MANNESMANN Export G.m.b.H.

Merton Engineering Co., Ltd.

Moto-Crane—see Thew Shovel Co.

Northwest Eng. Co.

Ohio Hoist & Mfg. Co.

Pettibone Mulliken Corp.

Quick Way Truck Shovel Co.

Service Supply Corp.

Smith & Sons (Rodley) Ltd., Thos.

STANCO MFG. & SALES, INC.

TRANSIT CRANE — SEE

BUCYRUS-ERIE CO.

TOURNAPULL—SEE LE TOUR-

NEAU-WESTINGHOUSE CO.

Uhrich, Inc.

Unit Crane & Shovel Corp.

### CRUSHERS

See also Laboratory Equipment and Supplies

### CONE

ALLIS-CHALMERS MFG. CO.

INDUSTRIES GROUP

AMERICAN BRAKE SHOE CO.

AMERICAN MANGANESE STEEL

STEEL DIV.

AMSCO—SEE AMERICAN BRAKE

SHOE CO.

STURTEVANT MILL CO.

NORDBERG MFG. CO.

Pennsylvania Crusher Co.

Pioneer Eng. Div., Poor & Co., Inc.

Pettibone Mulliken Corp.

Polyus G.m.b.H.

Pulva Corp.

PulvaSizer—see Pulva Corp.

PULVERATOR CO.—SEE ALLIS

CHALMERS MFG. CO.

Rogers Iron Works Co.

Simplicity Engineering Co.

Sprout, Waldron & Co., Inc.

STEPHENS-ADAMSON MFG. CO.

STURTEVANT MILL CO.

SYMONS—SEE NORDBERG MFG.

CO.

THUNES MEK. VERSTED, A. S.

Universal Engineering Corp.

Universal—see Pettibone Mulliken Corp.

Williams Crusher & Pulverizer Co.

Wulu, Buckau R (Maschinenfabrik)

A.G.

JAW

A-1—SEE ALLIS CHALMERS MFG. CO.

ALLIS-CHALMERS MFG. CO.

INDUSTRIES GROUP

ALLOY STEEL & METALS CO.

AMERICAN BRAKE SHOE CO.

AMERICAN MANGANESE STEEL

STEEL DIV.

AMSCO—SEE AMERICAN BRAKE

SHOE CO.

BALDWIN-LIMA-HAMILTON

CORP.

Bath Iron Wks. Corp.

Baxter, Ltd., W. H.

Bico, Inc.

Birdsboro Steel Foundry & Machine Co.

Broadbent, Robert & Son, Ltd.

Crusher Eng. Div., Poor & Co.

### GYRATORY

ALLIS-CHALMERS MFG. CO.

INDUSTRIES GROUP

AMERICAN BRAKE SHOE CO.

AMERICAN MANGANESE STEEL

DIV.

## Drills, Rock

### DFC—SEE DENVER FIRE CLAY CO., THE

DENVER EQUIP. CO.

DENVER FIRE CLAY CO.

Diamond Iron Works Div., Goodman Mfg. Co.

Eagle Crusher Co.

Farrel-Bacon—see Farrel-Birmingham Co.

Farrel-Birmingham Co., Inc.

Fraser & Chalmers

General Electric Co. Ltd., The Gibson, W. W.

Gruender Crusher & Pulverizer Co.

Gutschöffnungshutte A.G.

HADFIELDS LTD.

Humboldt, Klockner-Humboldt-

Deutz, A. G.

Iowa Manufacturing Co.

Jeffrey Manufacturing Co.

KENNEDY-VAN SAUN MFG. & ENG. CORP.

Klockner-Humboldt-Deutz, A. G.

Kue-ken—see Straub Mfg. Co., Inc.

Lippmann Engineering Works

MADSEN—SEE BALDWIN-LIMA-HAMILTON CORP.

MASSCO—SEE MINE & SMELTER SUPPLY CO.

MCLANAHAN & STONE CORP.

MINE & SMELTER SUPPLY CO.

Morgorshammar Mek. Verkstad A.B.

MORSE BROS. MACHINERY CO.

NORDBERG MFG. CO.

PACIFIC—SEE ALLOY STEEL & METALS CO.

Parker, Ltd., Frederick

Pegson, Ltd.

PENNSYLVANIA CRUSHER CO.

Pettibone Mulliken Corp.

Pioneer Engr. Div. Poor & Co., Inc.

Reliance—see Universal Road Machinery Co.

Rogers Iron Works Co.

Smith Engineering Works

Straub Mfg. Co., Inc.

STURTEVANT MILL CO.

SYMONS—SEE NORDBERG MFG. CO.

TAYLOR ENGINEERING & MFG. CO.

Universal—see Pettibone Mulliken Corp.

Universal Engineering Corp.

Universal Road Machinery Co.

Westfälische Maschinenbau G.m.b.H.

### ROLL

ACF Industries, Inc., American Car & Foundry Div.

ALLIS-CHALMERS MFG. CO., INDUSTRIES GROUP

AMERICAN BRAKE SHOE CO., AMER. MANGANESE STEEL DIV.

AMSCO—SEE AMERICAN BRAKE SHOE CO.

AUSTIN-WESTERN (SEE BALDWIN-LIMA-HAMILTON CORP.)

BALDWIN-LIMA-HAMILTON CORP.

Bath Iron Wks. Corp.

Bonded Scale & Machine Co.

British Jeffrey-Diamond Ltd.

COLORADO IRON WORKS CO.

Combustion Engineering Inc., Raymond Div.

Crusher Eng. Div., Poor & Co.

DENVER EQUIPMENT CO.

DENVER FIRE CLAY CO., THE

Diamond Iron Works Div., Goodman Mfg. Co.

Exxon Co., The

FAIRMONT—SEE ALLIS CHALMERS MFG. CO.

FLEXROLL—SEE JEFFREY MANUFACTURING CO.

Fraser & Chalmers

Gatke Corp.

General Electric Co. Ltd., The

Gruender Crusher & Pulverizer Co.

Gundlach Machine Co., Div. T. J. J. M. J. Industries, Inc.

HADFIELDS LTD.

Humboldt, Klockner-Humboldt-

Deutz, A. G.

Iowa Manufacturing Co.

International Combustion (Export) Ltd.

International Eng., Inc.

Jeffrey Manufacturing Co.

KENNEDY-VAN SAUN MFG. & ENG. CORP.

Klockner-Humboldt-Deutz A. G.

LINK-BELT CO.

Lippmann Engineering Works

MCCLANAHAN & STONE CORP.

McNally Pittsburgh Mfg. Co.

MINE & SMELTER SUPPLY CO.

THE MARCY MILL DIV.

MORSE BROS. MACHINERY CO.

Pennsylvania Crusher Co.

Pettibone Mulliken Corp.  
Pioneer Engr. Div., Poor & Co., Inc.

Rogers Iron Works Co.  
Smith Engineering Works  
STEPHENS-ADAMSON MFG. CO.  
STURTEVANT MILL CO.  
TAYLOR ENGINEERING & MFG. CO.

Union Iron Works Co.  
Universal—see Pettibone Mulliken Corp.

Universal Engineering Corp.  
Vulcan Patent Wks. Co. (Pa.)  
Williams Patent Crusher & Pulverizer Co.

Wilmot Eng. Co.

### CRUSHER PARTS

(Other than primary crusher manufacturer above)

Jaw and Cheek Plates

ALLIS-CHALMERS MFG. CO., INDUSTRIES GROUP

ALLOY STEEL & METALS CO., AMER. MANGANESE STEEL DIV.

COLUMBIA STEEL CASTING CO., INC.

Crusher Eng. Div., Poor & Co., ELECTRIC STEEL FOUNDRY CO.

HADFIELDS LTD.

Pettibone Mulliken Corp.

Taylor-Wharton Iron & Steel Co.

Wheel Trueing Tool Co.

Yield Engineering Co.

Zimmerman Eng. Co.

Zimmerman Eng. Co.

### CYCLOCLES

See also Classifiers

ALLISON STEEL MFG. CO.

American Air Filter Co., Inc.

Buell Eng. Co., Inc.

CENTRICLEONE—SEE DORR-OFFICE, INC.

Centrifugal & Mechanical Industries, Inc.

DORR-OFFICE

DORR-CLOCES—SEE DORR-OFFICE, INC.

Ducon Co.

General Electric Co. of England, Ltd.

Georgia Iron Wks.

EQUIPMENT ENG., INC.

HARDINGE CO., INC.

Heyl & Patterson, Inc.

Humboldt, Klockner-Humboldt-

Deutz, A. G.

JOHNSTON MARCH CORP.

Klockner-Humboldt-Deutz, A. G.

Liquid Solid Separations Ltd.

NORTHERN BLOWER CO.

Peterson Filters & Engineering Co.

STANDARD STEEL CORP.

Telluride Iron Works Co.

WESTERN MACHY. CO.

Williams Patent Crusher & Pulverizer Co.

Wilmot Eng. Co.

### CYLINDERS AND ACTUATORS

LEDEEN MFG. CO.

Wellman Engineering Co., The

Westinghouse Air Brake Co., Cleveland Rock Drill Div.

Westinghouse Air Brake Co., Inc.

Products Div.

Yield Engineering Co.

Zimmerman Eng. Co.

## Drives, Car

JOY MANUFACTURING CO.

Mayhew Supply Co.

MOBILE DRILLING INC.

PORTA-DRILL—SEE WINTER WEISS CO., THE

WEISS CO., THE

Reich Bros. Mfg. Co.

Salem Tool Co.

Salzgitter Maschinen Aktiengesellschaft

Thor Power Tool Co.

TRACDRILL—SEE JOY MFG. CO.

Westinghouse Air Brake Co., Cleveland Rock Drill Div.

Westinghouse Air Brake Co., Le Roi Div.

WINTER WEISS CO., THE

Wood & Co. Ltd., Hugh

### DIAMOND DRILLS

ACKER DRILL COMPANY, INC.

American Coldest Corp.

Atomic Eng. Corp.

BOYLES BROS. DRILLING CO.

BOYLES BROS. DRILLING CO., LTD. (CANADA)

CHICAGO PNEUMATIC TOOL CO.

Consolidated Pneumatic Tool Co., Ltd.

Damco—see Drilling Accessory & Mfg. Co., Inc.

DIAMOND DRILL CONTRACTING CO.

Drilling Accessory & Mfg. Co., Inc.

Du Jac Mfg. Co.

Failing Co., Geo. E.

General Electric Co., Carboly Dept.

Havilock, J. L.

Holeycat—see Atomic Eng. Corp.

Hitchcock, Leo L.

JOY MANUFACTURING CO.

Junction Bit & Tool Co.

Koebel Diamond Tool Co.

Longyear Co., E. J.

McClintock Co., R. S.

Metal Carbides Corp.

Moab Drilling Co.

MOBILE DRILLING INC.

Monarch Equipment Co.

Morgardshammar Mek. Verkstads A.R.

Pendrill—see Pennsylvania Drilling Co.

Pennsylvania Drilling Co.

Port-O-Powr—see Hitchcock Mfg. Co., Leo.

Porto Tool Co.

SPRAGUE & HENWOOD, INC.

Super Pioneer—see Diamond Drill Contracting Co.

TELLURIDE IRON WKS.

Tomco

Wheel Trueing Tool Co.

Wink Corp.

### GASOLINE DRILLS AND HAMMERS

ACKER DRILL CO.

Allied Geophysics

ATLAS COPCO EASTERN, INC.

ATLAS COPCO PACIFIC, INC.

ATLAS COPCO, A. B. SWEDEN

Banco Manufacturing Co.

Carpo Mfg. Co.

CHICAGO PNEUMATIC TOOL CO.

General Equipment Co.

Hausfeld Manufacturing Co.

PIONJAR—SEE STANCO MFG. & SALES INC.

Porto Drill Co.

Powermite Drill & Tool Co.

STANCO MFG. & SALES INC.

Swedika Motorborr AB., Stockholm-Solna, Sweden

SYNTRON CO.

### JET PIERCING DRILLS

BUCYRUS ERIC CO.

Carpco Mfg. Inc.

Linde Air Prod. Co.

Union Carbon & Carbide Corp.

Linde Air Products Co., Div.

### JUMBO AND BOOM ASSEMBLIES

See also Self Loading Transport

ATLAS COPCO, A. B. SWEDEN

CHICAGO PNEUMATIC TOOL CO.

Consolidated Pneumatic Tool Co., Ltd.

Drilled Co., Howard

GARDNER-DENVER CO.

Gismar—see Sanford Day Iron Wks.

HYDRO DRILL JIB—SEE JOY MANUFACTURING CO.

INGERSOLL-RAND CO.

JOY MANUFACTURING CO.

Lundin Steel Co.

MAYO TUNNEL & MINE EQUIP. CO.

Minerals & Engr. Co., (Colo.)

Mobile Drilling Inc.

Rogers Iron Works Co.

Sanford Day Iron Wks.

Thor Power Tool Co.

Westinghouse Air Brake Co., Cleve-

land Rock Drill Div.

Westinghouse Air Brake Co., Le

Roi Div.

WINTER WEISS CO., THE

### PERCUSSION DRILLS

#### Drifters

ATLAS COPCO, A. B. SWEDEN

ATLAS COPCO EASTERN, INC.

ATLAS COPCO PACIFIC, INC.

Bohler, Gebr. & Co. A.G.

CHICAGO PNEUMATIC TOOL CO.

Consolidated Pneumatic Tool Co., Ltd.

Dagenhardt-Utach K.G.

DEMAG AKTIENGESELLSCHAFT

Fleottmann G.m.b.H.

GARDNER-DENVER CO.

Hauhincor Maschinenfabrik

Hauscherr, Rudolf & Son G.m.b.H.

Holman Bros. (Canada) Ltd.

INGERSOLL-RAND CO.

JOY MANUFACTURING CO.

Le Roi Div., Westinghouse Air

Schumm Inc.

SILVER STREAK—SEE JOY MFG. CO.

Thor Power Tool Co.

Turbo-Maschinen A.G.

Westinghouse Air Brake Co., Cleve-

land Rock Drill Div.

Westinghouse Air Brake Co., Le

Roi Div.

### SINKERS

ATLAS COPCO, A. B. SWEDEN

ATLAS COPCO PACIFIC, INC.

ATLAS COPCO PACIFIC, INC.

CHICAGO PNEUMATIC TOOL CO.

Consolidated Pneumatic Tool Co., Ltd.

DEMAG AKTIENGESELLSCHAFT

Fleottmann G.m.b.H.

GARDNER-DENVER CO.

Hauscherr, Rudolf & Son G.m.b.H.

Hemscmidt, Hermann Maschinen-

fabrik

Holman Bros. (Canada) Ltd.

INGERSOLL-RAND CO.

JOY MANUFACTURING CO.

Le Roi Div., Westinghouse Air

Brake Co.

Powermite Drill & Tool Co.

Schramm Inc.

SILVER STREAK—SEE JOY MFG. CO.

SPANG & CO.

Thor Power Tool Co.

Turbo-Maschinen A.G.

Westinghouse Air Brake Co., Le

Roi Div.

### SHOT DRILLS

ACKER DRILL COMPANY, INC.

Cardox Corp.

Consolidated Pneumatic Tool Co., Ltd.

Damco—see Drilling Accessory & Mfg. Co., Inc.

Drilling Accessory & Mfg. Co., Inc.

Failing Co., George E.

Mayhew Supply Co.

Moab Drilling Co.

MOBILE DRILLING, INC.

Pendrill—see Pennsylvania Drill-

ing Co.

Pennsylvania Drilling Co.

PORTA-DRILL—SEE WINTER WEISS CO., THE

Reich Bros. Mfg. Co., Inc.

Salzgitter Maschinen Aktiengesell-

schaft

SPRAGUE & HENWOOD, INC.

Westinghouse Air Brake Co., (Pa.)

WINTER-WEISS CO., THE

### STOPERS

ATLAS COPCO, A. B. SWEDEN

ATLAS COPCO EASTERN, INC.

ATLAS COPCO PACIFIC, INC.

Bohler, Gebr. & Co. A.G.

CHICAGO PNEUMATIC TOOL CO.

Consolidated Pneumatic Tool Co., Ltd.

Dagenhardt-Utach K.G.

DEMAG AKTIENGESELLSCHAFT

Firth Sterling, Inc.

Flotmann G.m.b.H.

GARDNER-DENVER CO.

Hauhincor Maschinenfabrik

Hauscherr, Rudolf & Son G.m.b.H.

Holman Bros. (Canada) Ltd.

INGERSOLL-RAND CO.

JOY MANUFACTURING CO.

Le Roi Div., Westinghouse Air

Brake Co.

Fremag G.m.b.H.

SILVER STREAK — SEE JOY MFG. CO.

TELLURIDE IRON WKS.

Thor Power Tool Co.

Turbo-Maschinen A. G.

Westinghouse Air Brake Co., Cleve-

land Rock Drill Div.

Westinghouse Air Brake Co., Le

Roi Div.

### ROTARY DRILLS

ACKER DRILL COMPANY, INC.

Allied Geophysics

Augaburg-Nurnberg A. G., Masch-

inenfabrik (M.A.N.)

Bohler, Gebr. & Co. A.G.

BUCYRUS-ERIE CO.

Cardox Corp.

CHICAGO PNEUMATIC TOOL CO.

Conrad-Stork

Consolidated Pneumatic Tool Co., Ltd.

Dagenhardt-Utach A.G.

Damco—see Drilling Accessory Mfg. Co., Inc.

Drilling Accessory Mfg. Co., Inc.

Firth Sterling, Inc.

Flotmann-Werke G.m.b.H.

GARDNER-DENVER CO.

General Electric Co., Carboly Dept.

Hauhincor Maschinenfabrik

Hemscheidt, Hermann

Failing Co., Geo. E.

Hurricane—see Mayhew Supply Co.

INGERSOLL-RAND CO.

JOY MANUFACTURING CO.

Le Roi Div., Westinghouse Air

Brake Co.

Longyear Co. E. J.

Mayhew Supply Co.

Moab Drilling Co.

Mobile Drilling Inc.

Nott Core Drilling, Inc.

National Supply Co., (Pa.)

Pandrill—see Pennsylvania Drill-

ing Co.

Pennsylvania Drilling Co.

PORTA-DRILL — SEE WINTER WEISS CO., THE

Reich Bros. Mfg. Co.

Porto Tool Co.

Powermite Drill & Tool Co.

Premag G.m.b.H.

Reich Bros. Mfg. Co.

Rogers Iron Works Co.

Salzgitter Maschinen Aktiengesell-

schaft

Schramm Inc.

Star Expansion Pacific, Inc.

Thor Power Tool Co.

Varel Mfg. Co.

Vasco-Ramet Corp.

Westinghouse Air Brake Co., (Pa.)

Westinghouse Air Brake Co., Cleve-

land Rock Drill Div.

WINTER WEISS CO., THE

### TURBINE

Salzgitter Maschinen A.G.

### WAGON DRILLS

ATLAS COPCO, A. B. SWEDEN

ATLAS COPCO EASTERN, INC.

ATLAS COPCO PACIFIC, INC.

CHICAGO PNEUMATIC TOOL CO.

Consolidated Pneumatic Tool Co., Ltd.

Damenbrand-Utach K.G.

DEMAG AKTIENGESELLSCHAFT

Drilling Accessory & Mfg. Co., Inc.

Firth Sterling, Inc.

GARDNER-DENVER CO.

Hauscherr, Rudolf & Son G.m.b.H.

Holman Bros. (Canada) Ltd.

INGERSOLL-RAND CO.

JOY MANUFACTURING CO.

Le Roi Div., Westinghouse Air

Brake Co.

Longyear Co. E. J.

Mayhew Supply Co.

McClintock Co., R. S.

Mobile Drilling Inc.

Minerals Engr. Co., (Colo.)

Mott Core Drilling Co.

National Supply Co., (Pa.)

PORTA-DRILL — SEE WINTER WEISS CO., THE

Reich Bros. Mfg. Co.

Reich Bros. Mfg. Co.

Salzgitter Maschinen Aktiengesell-

schaft

Schramm Inc.

Star Expansion Pacific, Inc.

Thor Power Tool Co.

Varel Mfg. Co.

Westinghouse Air Brake Co., Le

Roi Div.

Worthington Corp.

GARDNER-DENVER CO.

Holeycat—see Atomic Eng. Corp.

INGERSOLL-RAND CO.

JOY MFG. CO.

Longyear Co., E. J.

Mayhew Supply Co.

McClintock Co., R. S.

Mobile Drilling Inc.

Minerals Engr. Co., (Colo.)

Mott Core Drilling Co.

National Supply Co., (Pa.)

PORTA-DRILL — SEE WINTER WEISS CO., THE

Powermite Drill & Tool Co.

Reich Bros. Mfg. Co.

Salzgitter Maschinen Aktiengesell-

## Electrical Equipment

### **DRYERS AND KILNS**

See also Sintering Machines; Coolers

#### **ALLIS-CHALMERS MFG. CO. INDUSTRIES GROUP**

American Locomotive Co.

#### **BARBER-GREENE CO.**

Bethlehem Steel Co.

Bird Machine Co.

Bodinson Mfg. Co.

#### **BOOTH CO., INC., THE**

BOOTH CONCENTRATE DRYER — SEE BOOTH CO., INC., THE

Carco Mfg. Inc.

Carrier Conveyer Corp.

Centrifugal & Mechanical Industries, Inc.

Christian Engineers, J. D. CO.

COLORADO IRON WORKS CO.

Combustion Engineering Inc., Raymond Div.

#### **DENVER EQUIPMENT CO.**

DORR-OLIVER, INC.

DRAGO CORP.

ELECTRIC STEEL FOUNDRY CO.

General American Transportation Corp.

General Machinery Co.

#### **GOLD & CO., GORDON I. HACK ENGINEERING CO.**

Hartinger, Walter

#### **HARDING CO., INC.**

Hazemag of Germany—see Hazemag USA, Inc.

Hevi Duty Electric Co.

Heyl & Patterson, Inc.

Hold-Flite—see Christian Engineers, J. D. CO.

HOLO-FLITE — SEE WESTERN PRECIPITATION CORP.

Humboldt, Klockner - Humboldt-Deutz, A. G.

Iowa Manufacturing Co.

KENNEDY-VAN SAUN MFG. & ENG. CORP.

Klockner-Humboldt-Deutz, A. G.

LINK-BELT CO.

Loesche, Germany

Lowden—see Colorado Iron Works

MCLANAHAN & STONE CORP.

MINE & SMELTER SUPPLY CO.

Nichols Engineering & Research Corp.

#### **NORDBERG MFG. CO.**

Ogden Iron Works Co.

PACIFIC FOUNDRY CO., LTD.

Parry Dryer—see Silver Engineering Co.

Pollock Co., The William B.

Polyus G.m.b.H.

Saracco Tank & Welding Co.

Silver Engineering Co.

SKINNER—SEE MINE & SMELTER SUPPLY CO.

SMIDTH & CO., F. L.

Standard Steel Corp.

STEARNS, ROGER MFG. CO.

Surface Combustion Corp.

TELLURIDE IRON WKS.

TRAYLOR ENG. & MFG. CO.

U.S. Dredge Mfg. Co.

VULCAN IRON WORKS, PA.

Washington Machinery Co.

WESTERN PRECIPITATION CORP.

Yuba Mfg. Div., Yuba Consolidated Industries, Inc.

### **DUMPERS, MINE CAR**

#### **ALLISON STEEL MFG. CO.**

ATLAS COPCO AB, SWEDEN

ATLAS COPCO EASTERN, INC.

ATLAS COPCO PACIFIC, INC.

CARD IRON WORKS CO., THE C. S.

Coeur d'Alene Hardware & Foundry Co.

Connellsville Mfg. & Mine Supply Co.

Differential Steel Car Co.

Gottwald, Leo

Getman Bros. Mfg. Divs., Inc.

Gregg Co., Ltd. The

Heyl & Patterson, Inc.

KAR-FLO—SEE LINK-BELT CO.

Koehring Co.

LAKE SHORE INC.

LINK-BELT CO.

McNally Pittsburgh Co.

MINERS FOUNDRY & MFG. CO.

Nolan Co., The

Ogden Iron Works Co.

Pacific Car & Foundry Co.

Pohlig, J. A.G.

Rogers Iron Wks.

TELLURIDE IRON WORKS

UNITED STATES STEEL EXPORT CO.

Wellman Engineering Co.

### **DUST COLLECTION EQUIPMENT**

Aeroturn—see Koppers Co. Inc., Metal Prod. Div.

American Air Filter Co.

American Blower Div. of American Standard

BARBER-GREENE CO.

Buell Engineering Co., Inc.

Combustion Engineering Inc., Raymond Div.

COTRELL — SEE WESTERN PRECIPITATION CORP.

DUALAIRE — SEE WESTERN PRECIPITATION CORP.

Ducon Co.

Dustube—see Wheelabrator Corp.

Frazer & Chalmers

General Electric Co. Ltd., The

Hazemag of Germany—see Hazemag USA, Inc.

Humboldt, Klockner - Humboldt-Deutz, A. G.

Iowa Manufacturing Co.

Jones Mfg. Corp.

JOY MFG. CO.

Klockner-Humboldt-Deutz, A. G.

Lynne Powerhouse—see Lynn Engr. & Supply Co.

Lynne Eng. Co.

Minneapolis-Moline Co.

Motor Generator Corp.

NORDBERG MFG. CO.

ONAN & Sons, Inc., D. W.

Power-Lite—see Lynn Eng. Co.

Ready Power Co.

Schoonmaker Co., Inc., P. G.

Sheppard Co., R. H.

STEARNS-ROGER MFG. CO.

Thor Power Tool Co.

Westinghouse Electric Corp.

Witte Engine Works, Oil Well Supply Div.

### **MOTOR MAINTENANCE EQUIP.**

Martindale Electric Co.

### **MOTORS, GENERATORS, AND CONVERTERS**

Allis Co., The Louis

ALLIS-CHALMERS MFG. CO., INDUSTRIES GROUP

ASEA ELECTRIC, INC.

ASEA, SWEDEN

Brown Boveri & Cie, A.G.

Caterpillar Tractor Co.

Connecticut Telephone & Electric Corp.

DELCO—SEE GENERAL MOTORS OVERSEAS OPERATIONS

Eaton Manufacturing Co.

Electric Machinery Mfg. Co.

Fairbanks, Morse & Co.

General Dynamics Corp., Electro Dynamic Div.

General Electric Co., Apparatus Sales Div.

General Electric Co., International

General Electric Co. of England, Ltd.

General Motors Corp., Electro-Motive Div.

General Metals Corp., Enterprise

Div.

GENERAL MOTORS OVERSEAS OPERATIONS

GRAYBAR ELECTRIC CO., INC.

Hillman Co. Inc., C. Kirk

International General Electric Co.

Kuhman Electric Co.

Mosebach Electric & Supply Co.

Reliance Electric & Engineering Co.

Schoonmaker Co., Inc., P. G.

Standard Transformer Co.

SYNTRON CO.

Texas Instruments, Inc., (Dallas)

Wagner Electric Corp.

WESTINGHOUSE ELECTRIC INTERNATIONAL CO.

Westinghouse Electric Corp.

Weston Electrical Instrument Corp.

### **MISCELLANEOUS (CONDENSERS, RESISTORS, POTENTIOMETERS, ETC.)**

ALLIS-CHALMERS MFG. CO., INDUSTRIES GROUP

ASEA, SWEDEN

Cutter-Hammer, Inc.

Eaton Mfg. Co., Dynamatic Divs.

EC&M Frequency Relay Control—

see Electric Controller & Mfg. Co.

EC&M Valimotor—see Electric Controller & Mfg. Co., The

Edwards Co., Inc.

Electric Controller & Mfg. Co., The

General Electric Co. Apparatus Sales Div.

General Electric Co., International

GRAYBAR ELECTRIC CO., INC.

Hillman Co., Inc., C. Kirk

Ideal Industries, Inc.

International General Electric Co.

JOY MANUFACTURING CO.

Martindale Electric Co.

Metropolitan-Vickers Electrical Co., Ltd.

Micro-Switch Div. of Minneapolis

Honeywell Regulator Co.

Minneapolis-Honeywell Regulator Co., Indus. Div.

Mosebach Elec. & Supply Co.

National Mine Service Co.

Ohio Carbon Co., The

Ohiohm—see Ohio Carbon Co., The

Rawson Electrical Instrument Co.

REGULEX—SEE ALLIS-CHALMERS MFG. CO.

Revere Electric Manufacturing Co.

Rowan Controller Co.

RUPTAIR—SEE ALLIS-CHALMERS MFG. CO.

Siemens & Halske A.G.

Signal Engr. & Mfg. Co.

Superior Carbon Prod., Inc.

Texas Instruments, Inc. (Dallas)

Trombetta Solenoid Corp.

Ward Leonard Electric Co.

Wright Electric Manufacturing Co.

Zimmerman Controller Co.

\*\* See also under individual company names.

**Manufacturer's Complete Names and Addresses are listed in Section II, last pages of this yellow section. Firms appearing in boldface caps carry advertisements in this issue.**

## Engine Exhaust Conditioners, Underground

Westinghouse Electric Corp.  
WESTINGHOUSE ELECTRIC INTERNATIONAL CO.  
Weston Electrical Instrument Corp.

## ENGINE EXHAUST CONDITIONERS, UNDERGROUND

Hunsler Engine Co. Ltd., The OCM Catalytic Exhaust, OCM Diesel Exhaust, OXY-Muffler Exhaust—see Oxy-Catalyst, Inc.

Oxy-Catalyst, Inc.  
Ruth Co., The

## ENGINEERING SERVICES

See Plant Design and Construction; Exploration Services; Consulting Mining Engineers

## ENGINEERING SUPPLIES & DRAFTING EQUIPMENT

See also Surveying Instruments

Bausch & Lomb Optical Co.  
Berger & Sons, Inc.  
Booklime, Inc.  
Dietzgen Co., Eugene  
General Aniline & Film Corp., Ozalid A Div.  
Geo-Optics Co., Inc.  
Keuffel & Esser Co.  
Lefax  
Lufkin Rule Co.  
Pack Mfg. Co.  
Post Co., Frederick  
Rocky Mountain Instrument Co.  
Rotolite Co.  
White Instrument Co., David  
WILD HEERBRUGG INSTRUMENTS, INC.

## ENGINES

See also Electrical Equipment

### DIESEL AND SEMI-DIESEL

Aero Products, Inc.  
ALLIS-CHALMERS MFG. CO., CONST. MACHY. DIV.  
ALLIS-CHALMERS MFG. CO., INDUSTRIES GROUP  
Allis-Chalmers Mfg. Co., Buda Co., The  
American Locomotive Co.  
Baldwin-Lima-Hamilton Corp., Edystone Div.  
Blackburn International Corp.  
Caterpillar Tractor Co.  
**CHICAGO PNEUMATIC TOOL CO.**  
Continental Motors Corp.  
Cooper-Bessemer Corp., The  
Cummins Engine Co., Inc.  
Diesel Energy Corp., Klockner-Humboldt-Deutz A. G.  
Dorman & Co. Ltd., W. H.  
Enterprise Eng. & Mach. Co.  
Fairbanks, Morse & Co.  
General Metals Corp., Enterprise Div.  
General Metals Corp., Enterprise Engine & Machinery Co.—a Subsidiary  
General Motors Corp., Detroit Diesel Engine Division  
General Motors Corp.—Electro-motive Div.

### GENERAL MOTORS OVERSEAS OPERATIONS

Hall-Scott Motors, Inc.  
**HARNISCHFEGER CORP.**  
Hercules Motor Corp.  
INGERSOLL-RAND CO.  
International Harvester Co.  
**INTERNATIONAL HARVESTER EXPORT CO.**  
Klockner-Humboldt-Deutz, A. G.  
Lister-Blackstone, Inc.  
Mannesmann Export G.m.b.H.  
Minneapolis-Moline Co.  
**MIRLEES, BICKERTON & DAY LTD.**  
**NORDBERG MFG. CO.**  
Onan & Sons, Inc., D.W.  
**P & H—SEE HARNISCHFEGER CORP.**  
Roder-Blackburn Int'l. Corp.  
**RUSTON & HORNSBY LTD.**  
Schoonmaker Co., Inc., P. G.  
Sheppard Co., R. H.  
Waukesha Motor Co.

**WHITE MOTOR CO., THE**  
Witte Eng. Wks., Oil Well Supply Div.  
**U. S. STEEL CO.**  
Worthington Corp.

### GAS

**ALLIS-CHALMERS MFG. CO., CONST. MACHY. DIV.**  
**ALLIS-CHALMERS MFG. CO., INDUSTRIES GROUP**  
Allis-Chalmers Mfg. Co., Buda Div.  
Caterpillar Tractor Co.  
**CHICAGO PNEUMATIC TOOL CO.**  
Continental Motor Corp.  
Cooper-Bessemer Corp.  
Cummins Engine Co., Inc.  
Enterprise Eng. & Mach. Co.  
Fairbanks, Morse & Co.  
General Metals Corp., Enterprise Div.

Hall-Scott Motors, Inc.  
Hercules Motors Corp.  
**INGERSOLL-RAND CO.**  
International Harvester Co.  
**INTERNATIONAL HARVESTER EXPORT CO.**  
Klockner-Humboldt-Deutz, A. G.  
Kohler Co.  
Minneapolis-Moline Co.  
**NORDBERG MFG. CO.**  
Onan & Sons, Inc., D. W.  
Waukesha Motor Co.

**WHITE MOTOR CO., THE**  
Wisconsin Motor Corp.  
Witte Eng. Wks., Oil Well Supply U. S. STEEL CORP.

Worthington Corp.

### GASOLINE

Allis-Chalmers Mfg. Co., Const. Machy. Div.  
**ALLIS-CHALMERS MFG. CO., INDUSTRIES GROUP**  
Allis-Chalmers Mfg. Co., Buda Co., Div.

Briggs & Stratton Corp.  
Continental Motors Corp.  
Fairbanks, Morse & Co.  
G. M. C., Allison Div.

**GENERAL MOTORS OVERSEAS OPERATIONS**

**HALL-SCOTT MOTORS, INC.**  
Hercules Motors Corp.  
International Harvester Co.  
**INTERNATIONAL HARVESTER EXPORT CO.**

Kohling Southern Co.  
Kohler Co.  
Le Roy Div., Westinghouse Air Brake Co.

**MINE & SMOELTER SUPPLY CO., THE MARCY MILL DIV.**

Minneapolis-Moline Co.  
National Supply Co., The, Engine Div.

Onan & Sons, Inc., D. W.  
Ruston & Hornsby Ltd.  
Turbo Jet—see G. M. C., Allison Div.

Turbo Prop—see G. M. C., Allison Div.

Waukesha Motor Co.  
Westinghouse Air Brake Co., Le Roy Div.

Westinghouse Air Brake Co. (Pa.)  
Wisconsin Motor Corp.  
Witte Engine Works, Oil Well Supply Div., U. S. Steel Corp.

**EXCAVATORS**

See also Tractors and Attachments; Dredges and Dredge Buckets; Leaders; Monitors; Scrappers; Backhoes

**ALLIS-CHALMERS MFG. CO., CONSTRUCTION EQUIPMENT DIVISION**  
American Brake Shoe Co.  
**BALDWIN-LIMA-HAMILTON CORP.**

Bantam—see Schield Bantam Co.  
Bay City Shovels, Inc.  
**BUCYRUS-ERIE CO.**

CLARK EQUIP. CO., CONSTRUCTION MACH. DIV.

Electric Steel Foundry Co.  
Fastback—see Electric Steel Foundry Co.

Harnischfeger Corp.  
Hyster Co.  
Koehring Co.

**LIMA—SEE BALDWIN-LIMA-HAMILTON CORP.**

Link Belt Speeder Corp.  
**LORAIN—SEE THEW SHOVEL CO.**  
**MARION POWER SHOVEL CO.**  
Northwest Eng. Co.

Pence & Co., Inc., Earl H.  
Petibone Mulliken Corp.  
Quick-Way Truck Shovel Co.

Schield Bantam Co.  
Theew Shovel Co.  
Tractohoe—see Tractomotive Corp.

Tractomotive Corp.  
Unit Crane & Shovel Corp.  
Westinghouse Air Brake Co., Le Roy Div.

"Bucket Wheel Excavators"  
Fried Krupp  
Orenstein-Koppel and Lubecker Maschinenbau A.G.

### CABLEWAYS

**CLARK EQUIP. CO., CONSTRUCTION MACH. DIV.**  
**SAUERMAN BROS., INC.**  
Washington Iron Works

### CABLEWAYS

**CLARK EQUIP. CO., CONSTRUCTION MACH. DIV.**  
**SAUERMAN BROS., INC.**

### DRAGLINES

**Diesel**

American Hoist & Derrick Co., **BALDWIN-LIMA-HAMILTON CORP.**

Bantam—see Schield Bantam Co.  
Bay City Shovel Inc.  
**BUCYRUS-ERIE CO.**

**CLARK EQUIP. CO., CONST. MACH. DIV.**  
**DEMAG AKTIENGESELLSCHAFT**

Fa. Ten Pas & Co.  
Gar Wood Industries, Inc.  
**HARNISCHFEGER CORP.**

Koehring Co.  
**LIMA—SEE BALDWIN-LIMA-HAMILTON CORP.**

Link Belt Speeder Corp.

**LORAIN—SEE THEW SHOVEL CO.**

**MARION POWER SHOVEL CO.**  
Menck & Hambrock G.m.b.H.

**MICHIGAN—SEE CLARK EQUIPMENT CO.**  
Newton Chambers & Co., Ltd.  
Northern Engineering Co.

**P & H—SEE HARNISCHFEGER CORP.**

Quick-Way Truck Shovel Co.  
Ruston-Bucyrus Ltd.  
Schield Bantam Co.

Smith & Sons (Rodley) Ltd., Thos.  
Theew Shovel Co.

Traxcautor—see Caterpillar Tractor Co.

Unit Crane & Shovel Corp.  
Wesserhutte Otto Wolff G.m.b.H.

Westinghouse Air Brake Co. (Pa.)  
**WESTINGHOUSE CO., LE TOURNEAU**  
Woodbridge Mfg. Div., Continental Copper & Steel Industries, Inc.

### SHAFT MUCKERS—see Shaft

#### Sinking

#### SHOVELS, POWER

#### Diesel

American Hoist & Derrick Co., **BALDWIN-LIMA-HAMILTON CORP.**, **LIMA—HAMMER**

Bay City Shovels, Inc.  
**BUCYRUS-ERIE CO.**  
Caterpillar Tractor Co.

**CLARK EQUIPMENT CO., CONST. MACH. DIV.**  
Clark Equipment Co.  
Clyde Iron Works, Inc.

**DEMAG AKTIENGESELLSCHAFT**  
Eimco Corp., The  
**ELECTRIC STEEL FOUNDRY CO.**  
Gar Wood Industries, Inc.  
**HARNISCHFEGER CORP.**

Koehring Co.  
**LIMA—SEE BALDWIN-LIMA-HAMILTON CORP.**

Link-Belt Speeder Corp.  
Lorain—see Theew Shovel Co.  
**MANITOWOC ENGINEERING CORP.**

**MARION POWER SHOVEL CO.**  
Menck & Hambrock G.m.b.H.

**MICHIGAN—SEE CLARK EQUIPMENT CO.**  
Newton Chambers & Co., Ltd.  
Northern Engineering Co.

**P & H—SEE HARNISCHFEGER CORP.**

Quick-Way Truck Shovel Co.  
Ruston-Bucyrus Ltd.  
Schield Bantam Co.

Smith & Sons (Rodley) Ltd., Thos.  
Theew Shovel Co.

Traxcautor—see Caterpillar Tractor Co.

Unit Crane & Shovel Corp.  
Wesserhutte Otto Wolff G.m.b.H.

#### Electric

American Hoist & Derrick Co., Crosby-Laughlin Div.

Bantam—see Schield Bantam Co.  
Bay City Shovels, Inc.  
**BUCYRUS-ERIE CO.**

**DEMAG AKTIENGESELLSCHAFT**  
Eimco Corp., The  
**ELECTRIC STEEL FOUNDRY CO.**  
Goodman Mfg. Co.  
**HARNISCHFEGER CORP.**

Koehring Co.  
Link-Belt Speeder Corp.

Lorain—see Theew Shovel Co.  
**MANITOWOC ENGINEERING CORP.**

**MARION POWER SHOVEL CO.**  
Menck & Hambrock G.m.b.H.

**MICHIGAN—SEE CLARK EQUIPMENT CO.**  
P & H—SEE HARNISCHFEGER CORP.

Salzgitter Maschinen Aktiengesellschaft

Schield Bantam Co.  
**THEW SHOVEL CO.**  
Unit Crane & Shovel Corp.

### PARTS AND ATTACHMENTS

**ALLOY STEEL & METALS CO.**  
**AMERICAN BRAKE SHOE CO., AMER. MANGANESE STEEL DIV.**

American Hoist & Derrick Co., **AMSCO—SEE AMERICAN BRAKE SHOE CO.**

**BALDWIN-LIMA-HAMILTON CORP.**  
Caterpillar Tractor Co.

**CLARK EQUIP. CO., CONSTRUCTION MACH. DIV.**  
**COLORADO FUEL & IRON CORP.**

Dolmar Maschinen Fabrik  
Eimco Corp., The  
**ELECTRIC STEEL FOUNDRY CO.**  
Gar Wood Industries, Inc.

**HADDIFFIELDS LTD.**  
**HARNISCHFEGER CORP.**  
Hensley Equip. Co.

Koehring Co.  
Link-Belt Speeder Corp.  
**MANITOWOC ENGINEERING CORP.**

**MARION POWER SHOVEL CO.**  
Owen Bucket Co.  
**PACIFIC—SEE ALLOY STEEL & METALS CO.**  
Page Engineering Co.

Pence & Co., Inc., Earl H.

## Feeders

Pettibone Mulliken Corp.  
Quick-Way Truck Shovel Co.  
R-Mor—see Vulcan Foundry Co.  
Taylor Wharton Iron & Steel Co.  
The Shovel Co.  
Unit Crane & Shovel Corp.  
Vulcan Foundry Co.  
Weserbutte Otto Wolf G.m.b.H.  
Westinghouse Air Brake Co., Ind.  
Products Div.  
Westinghouse Air Brake Co., Le  
Roi Div.

## EXPLORATION EQUIPMENT

See also Drills, Rock

### Geochemical Equipment

Analytical Measurements, Inc.  
Drullard Co., Howard  
International Geophysics, Inc.  
Menlo Research Lab.  
Mobile Drilling, Inc.  
Research Inc.

### Geophysical Equipment

Allied Geophysics  
Alpine Laboratories, Ltd.  
Analytical Measurements, Inc.  
Askania-Werke A.G.  
Detector Corp.  
Eberline Inst. Div.—Reynolds Elect.  
& Eng. Co.  
Electro-Technical Labs.  
Engineers Syndicate, Ltd.  
Fisher Research Laboratory, Inc.  
Geodynamics, Inc.  
Geo-Optic Co., Inc.  
Geophysical Specialties Co.  
Hydro-Aerial Surveys, Inc.  
International Geophysics, Inc.  
JOY MFG. CO.  
La Roe Instruments, Inc.  
Longyear Co., E. J.  
M-Scope—see Fisher Research Laboratory, Inc.  
Menlo Research Lab.  
Mobile Drilling, Inc.  
Nucleonic Corp. of America  
Precision Radiation Instruments, Inc.  
Radiac Co., Inc., The  
Rawson Electrical Instrument Co.  
Research Inc.  
Salem Tool Co.  
Texas Instrument, Inc. (Dallas)  
Texas Instruments, Inc., Industrial  
Instrumentation Div. (Houston)  
Ultra-Violet Products, Inc.  
United Geophysical Corp.  
Universal Atomics, Div. of Univ.  
Transistor Prod. Corp.  
Uranium Enterprises  
VARIAN ASSOCIATES  
Victoreen Instrument Co.  
Western Radiation Lab.  
Westinghouse Electric Corp.  
Whites' Electronics

### ULTRA VIOLET LIGHTS

Mineralight—see Ultra Violet Prod.  
Inc.  
Ultra Violet Prod., Inc.

## EXPLORATION SERVICES

### Aircraft

Aero Service Corp.  
Aero Service Corp. (Mid-Continent)  
Aero Service Corp. (Western)  
African Surveys (Proprietary Ltd.)  
Autair, Ltd.  
**BELL HELICOPTER CO.**  
Canadian Aero Service Ltd.  
Engineers Syndicate, Ltd.  
International Geophysics, Inc.  
Porto Tool Co.  
Rick Helicopters  
Tate Mine Contracting & Devel. Co.  
World Wide Aerial Surveys (Aust.)  
Pty. Ltd.

### DRILLING

#### Churn

**DIAMOND DRILL CONTRACTING CO.**  
International Geophysics, Inc.  
Koebl Diamond Tool Co.  
Longyear Co., E. J.  
McDonald, T. J.  
Minerals Engineering Co., (Colo.)  
Moab Drilling Co.  
Mott Core Drilling Co.  
Pennsylvanian Drilling Co.  
Salzgitter Maschinen Aktiengesellschaft  
**SPANG & CO.**  
**SPRAGUE & HENWOOD, INC.**

World Mining Consultants, Inc.  
Yuba Manufacturing Co.

### Diamond

Allied Geophysics  
**BOYLES BROS. DRILLING CO.**  
**BOYLES BROS. DRILLING CO. LTD. (CANADA)**  
**DIAMOND DRILL CONTRACTING CO.**  
Du Jac Mfg. Corp.  
Havliek, J. L.  
Hitchcock Mfg. Co., Leo  
International Geophysics, Inc.  
**JOY MANUFACTURING CO.**  
Junction Bit & Tool Co.  
Koebl Diamond Tool Co.  
**LIVINGSTON & WILSON EXPLORATION & DRILLING CO.**

Longyear Co., E. J.  
McClintock Co., R. S.  
McDonald, T. J. (Colo.)  
Minerals Engineering Co.  
**MOAB DRILLING CO.**  
Mobile Drilling, Inc.  
Mott Core Drilling Co.  
Pennsylvania Drilling Co.  
**SHAMROCK DRILLING ENTERPRISES**

### Rotary

Allied Geophysics  
**BOYLES BROS. DRILLING CO. LTD. (CANADA)**  
Cardox Corp.  
**DEMAG AKTIENGESELLSCHAFT**  
Exploration Drilling Co.  
Geodynamics, Inc.  
International Geophysics, Inc.  
**JOY MANUFACTURING CO.**  
Longyear Co., E. J.  
Minerals Engr. Co., (Colo.)  
Mobile Drilling, Inc.  
Mott Core Drilling Co.  
Pennsylvania Drilling Co.  
Reich Bros. Mfg. Co.  
St. Clair, John Q.  
Salzgitter Maschinen Aktiengesellschaft.  
United Geophysical Corp.  
World Mining Consultants, Inc.

### SURVEYING

#### Aerial

Abrams Aerial Survey Corp.  
Aero Service Corp.  
Aero Service Corp. (Mid-Continent)  
Aero Service Corp. (Western)  
African Surveys (Proprietary Ltd.)  
Canadian Aero Service Ltd.  
Chowan and Wood  
**ELLIOTT, D. W.**  
Fairchild Aerial Surveys, Inc.  
Geodynamics, Inc.  
Geo-Optic Co., Inc.  
Geoprofessional Services, Inc.  
Hunting Associates, Ltd.  
Hycon Aerial Surveys, Inc.  
International Geophysics, Inc.  
Laylander, Philip A.  
Longyear Co., E. J.  
Lundberg Explorations, Ltd.  
Menlo Research Lab.  
Minerals Exploration Research Corp.

Mott & Sons, Inc., B. H.  
Permo Exploration Co.  
Precision Radiation Instruments, Inc.  
Radian Company, Inc., The  
Research, Inc.  
Sloan, DBA & Associates  
St. Clair, John Q.  
**STILL & STILL**  
Tracerlabs, Inc.  
Uranium Enterprises  
Uranium Research & Devel. Corp.  
World Wide Aerial Surveys (Aust.)  
Pty. Ltd.

### Geochemical

Alderman, Sidney S., Jr.  
Drullard Co., Howard  
Geodynamics, Inc.  
International Geophysics, Inc.

Longyear Co., E. J.  
Menlo Research Lab.  
Minerals Exploration Research Corp.  
Ore Research & Laboratories  
Radius Company, Inc., The  
Research, Inc.  
**STILL & STILL**  
Wisner & Cox

### Geological

Abrams Aerial Survey Corp.  
Aero Service Corp.  
Aero Service Corp. (Mid-Continent)  
Aero Service Corp. (Western)  
African Surveys (Proprietary Ltd.)  
Alderman, Sidney S., Jr.  
Bartell, C. P.  
**BOYLES BROS. DRILLING CO.**  
Canadian Aero Service Ltd.  
**CHAPMAN WOOD, AND GRISWOLD**

Davis & Davis  
Engineers Syndicate Ltd.  
Fairchild Aerial Surveys, Inc.  
Fisher Research Laboratory, Inc.  
Geodynamics, Inc.  
Geo-Engineering  
Geo-Optic Co., Inc.  
Geoprofessional Services Inc.  
Hulin, Carlton D.  
Hycon Aerial Surveys, Inc.  
International Geophysics, Inc.  
Keegel, C. P.  
Laylander, Philip A.  
Longyear Co., E. J.  
M-Scope—see Fisher Research Laboratory, Inc.  
Menlo Research Lab.  
Minerals Exploration Research Corp.  
Moab Drilling Co.  
Mobile Drilling Inc.  
Murphy, F. M.  
Ore Research & Laboratories  
Peale, Rogers  
Perrin Exploration Co.  
Precision Radiation Instruments, Inc.

Radiac Co. Inc., The  
Ray Drilling Co., Inc.  
Schrotter & Lockwood  
Sheidwick Jr., Wm. J.  
St. Clair, John Q.  
Stephenson, Robert C.  
**STILL & STILL**  
United Geophysical Corp.  
Uranium Enterprises  
Uranium Exploration  
Uranium Research & Devel. Co.  
**WISNER & COX**  
World Mining Consultants, Inc.  
World Wide Aerial Surveys (Aust.)  
Pty. Ltd.

### Geophysical

Aero Service Corp.  
Aero Service Corp. (Mid-Continent)  
Aero Service Corp. (Western)  
African Surveys (Proprietary Ltd.)  
Alderman, Sidney S., Jr.  
Allied Geophysics  
Alpine Laboratories, Ltd.  
Canadian Aero Service Ltd.  
Chowan and Wood  
**ELLIOTT, D. W.**  
Fairchild Aerial Surveys, Inc.  
Geodynamics, Inc.  
Geo-Optic Co., Inc.  
Geoprofessional Services, Inc.  
Hunting Associates, Ltd.  
Hycon Aerial Surveys, Inc.  
International Geophysics, Inc.  
Longyear Co., E. J.  
Lundberg Explorations, Ltd.  
M-Scope—see Fisher Research Laboratory, Inc.  
Menlo Research Lab.  
Minerals Exploration Research Corp.  
Mining & Geophysical Services, Ltd.  
Moab Drilling Co.  
Mobile Drilling, Inc.  
Peale, Rogers  
Precision Radiation Instruments, Inc.

Radiac Co., Inc., The  
Research, Inc.  
Seismograph Service Corp.

**SHAMROCK DRILLING ENTERPRISES**  
**STILL & STILL**  
Texas Instruments, Inc. (Dallas)  
Tracerlab, Inc.  
United Geophysical Corp.  
Uranium Enterprises  
World Mining Consultants, Inc.  
World Wide Aerial Surveys (Aust.)  
Pty. Ltd.

## EXPLOSIVES

See Blasting Supplies

## FANS

See Ventilation Equipment and Supplies

## FASTENERS, BELT

ABCs Scale Division, McDowell Co., Inc.  
Alligator—see Flexible Steel Lacing Co.  
American Rubber Mfg. Co.  
Armstrong-Bray & Co.  
Clipper Beltlacer Co.  
Continental Gin Co.  
Crescent Belt Fastener Co., Inc.  
Flexo—see Flexible Steel Lacing Co.  
Flexible Steel Lacing Co.  
General Electric Co. Ltd., The  
**GOODALL RUBBER CO.**  
National Mine Service Co.  
Plategrip—see Armstrong-Bray & Co.  
Steelgrip—see Armstrong-Bray & Co.  
Talcott, Inc., W. O. & M. W.  
Three Point Belt Lacing, Inc.

## FEEDERS

### ORE

#### Apron

**AMERICAN BRAKE SHOE CO., AMER. MANGANESE STEEL DIV.**  
**AMSCO—SEE AMERICAN BRAKE SHOE CO.**  
**BARBER-GREENE CO., INC.**  
Baxter Ltd., W. H.  
Bodinson Mfg. Co.  
Bonded Scale & Mach. Co.  
Chain Belt Co.  
Christian Engineers, J. D.  
Continental Gin Co.  
Conveyor Co., The  
**DEMAG AKTIENGESELLSCHAFT**  
**DENVER EQUIPMENT CO.**  
Diamond Iron Works Div., Goodman Mfg. Co.  
Eickhoff, Gebr. Maschinenfabrik u. Eisengiesserei G.m.b.H.  
**ELECTRIC STEEL FOUNDRY CO.**  
Fraser & Chalmers  
General Electric Co., Ltd., The  
**HACK ENGINEERING CO.**  
**HADFIELDS LTD.**  
**HARDINGE CO., INC.**  
Hirsch Bros. Machinery Co.  
Humboldt, Klockner-Humboldt-Deutz, A. G.  
Iowa Mfg. Co., Manufacturing Co.  
**KENNEDY-VAN SAUN MFG. & ENG. CORP.**  
Klockner-Humboldt-Deutz, A. G.  
**LINK-BELT CO.**  
Lippmann Engineering Works  
**MCLANAHAN & STONE CO.**  
McNally Pittsburgh Co.  
**MINE & SMELTER SUPPLY CO.**  
**MINERS FOUNDRY & MFG. CO.**  
**MORSE BROS. MACHINERY CO.**  
**NATIONAL IRON CO.**  
**NORDBERG MFG. CO.**  
Ogden Iron Works Co.  
Pettibone Mulliken Corp.  
Pioneer Engineering Div., Poor & Co., Inc.  
Rex—see Chain Belt Co.  
Richardson Scale Co.  
Rogers Iron Works Co.  
**ROSS SCREEN & FEEDER CO.**  
Smith Engineering Works  
**SOUTHWESTERN ENG. CO.**  
**STEPHENS-ADAMSON MFG. CO.**  
Taylor-Wharton Iron & Steel Co.  
**TELLURIDE IRON WORKS.**  
Tisco—see Taylor-Wharton Iron & Steel Co.  
**TRAYLOR ENG. & MFG. CO.**  
Universal—see Pettibone Mulliken Corp.  
Universal Dredge Mfg. Co.

**Manufacturer's Complete Names and Addresses are listed in Section II, last pages of this yellow section. Firms appearing in boldface carry advertisements in this issue.**

## Filter Media

Universal Engineering Corp.  
Washington Machinery Co.  
Wilmot Engineering Co.

### Belt

ABCs Scale Division, McDowell Co., Inc.

American Rubber Mfg. Co.

B. I. F. Industries, Inc.

**BARBER GREENE CO.**

Bear—see American Rubber Mfg. Co.

Bodinson Mfg. Co.

Bonded Scale and Machine Co.

Chain Belt Co.

Christian Engineers, J. D.

Continental Gin Co.

Conveyor Co., The

Crackerjack—see American Rubber Co., Inc.

**DEMAG AKTIENGESELLSCHAFT**

**DENVER EQUIPMENT CO.**

Flexible Steel Lacing Co.

Fraser & Chalmers

**HACK ENG. CO.**

**HARDINGE CO., INC.**

**HEWITT-ROBBINS, INC.**

Hirsch Bros. Machinery Co.

Humboldt, Klockner-Humboldt-

Deutz, A. G.

**INTERNATIONAL B. F. GOODRICH**

Iowa Mfg. Co.

Jeffrey Manufacturing Co.

**KENNEDY-VAN SAUN MFG. & ENG. CORP.**

Klockner-Humboldt-Deutz, A. G.

**LINK-BELT CO.**

Lippmann Engineering Works

Magnetic Eng. & Mfg. Co.

McDowell Co., Inc.

**MCLANAHAN & STONE CORP.**

MINE & SMELTER SUPPLY CO.

THE MARCY MILL DIV.

**MINERS FOUNDRY & MFG. CO.**

Morse Bros. Machinery Co.

Ogden Iron Works Co.

Pettibone Mulliken Corp.

Rex—see Chain Belt Co.

Richardson Scale Co.

Smith Engineering Works

**STEPHENS-ADAMSON MFG. CO.**

Straub Mfg. Co., Inc.

**TELLURIDE IRON WORKS CO.**

**THERMOID CO.**

Universal Dredge Mfg. Co.

Universal Road Mach.

Washington Machinery Co.

### Chain

**AMERICAN BRAKE SHOE CO., AMER. MANGANESE STEEL DIV.**

**AMSCO—SEE AMERICAN BRAKE SHOE CO.**

Bodinson Mfg. Co.

Chain Belt Co.

Christian Engineers, J. D.

Continental Gin Co.

Conveyor Co., The

**DEMAG AKTIENGESELLSCHAFT**

**ELECTRIC STEEL FOUNDRY CO.**

**HACK ENG. CO.**

**HARDINGE CO., INC.**

Hirsch Bros. Machy. Co.

Humboldt, Klockner-Humboldt-

Deutz, A. G.

Jeffrey Manufacturing Co.

Klockner-Humboldt-Deutz, A. G.

**LINK-BELT CO.**

Lippmann Engineering Works

Ogden Iron Works Co.

Rex—see Chain Belt Co.

Richardson Scale Co.

Smith Engineering Works

**STEPHENS-ADAMSON MFG. CO.**

**TELLURIDE IRON WORKS, CO.**

Theile, August G.m.b.H.

Universal Dredge Mfg. Co.

### Constant Weight

ABCs Scale Division, McDowell Co., Inc.

Conveyor Co., The

**HARDINGE CO., INC.**

Jeffrey Manufacturing Co.

**KENNEDY-VAN SAUN MFG. & ENG. CORP.**

International Combustion, Ltd.

Link-Belt Co.

**MERRICK SCALE MFG. CO.**

**POIDOMETER—SEE SCHAFER POIDOMETER CO.**

Richardson Scale Co.

**SCHAFFER POIDOMETER CO.**

Simplicity Engineering Co.

**SYNTRON CO.**

Washington Mach. Co.

**WAYTROL—SEE JEFFREY MANUFACTURING CO., THE**

### RECIPROCATING

**GOULD & CO., GORDON I. LINK-BELT CO.**

### DISC

**DEISTER CONCENTRATOR CO. LINK-BELT CO.**

### Fan

Bodinson Mfg. Co.

Bonded Scale and Machine Co.

Chain Belt Co.

Christian Engineers, J. D.

Cleveland Vibrator Co., The

Continental Gin Co.

Conveyor Co., The

Diamond Iron Works Div., Good-

man Mfg. Co.

**ELECTRIC STEEL FOUNDRY CO.**

**HACK ENGINEERING CO.**

**HADFIELDS LTD.**

Hirsch Bros. Machinery Co.

Humboldt, Klockner-Humboldt-

Deutz, A. G.

Iowa Mfg. Co.

Jeffrey Manufacturing Co.

**KENNEDY-VAN SAUN MFG. & ENG. CORP.**

Klockner-Humboldt-Deutz, A. G.

**LINK-BELT CO.**

Lippmann Engineering Works

McNally Pittsburgh Co.

**MINERS FOUNDRY & MFG. CO.**

NATIONAL IRON CO.

Ogden Iron Works Co.

Os-A-Veyor—see Simplicity Eng.

Co., Inc.

Pioneer Engineering, Div. Poor &

Co., Inc.

Rex—see Chain Belt Co.

Simplicity Engineering Co.

Smith Engineering Works

**STEPHENS-ADAMSON MFG. CO.**

Straub Mfg. Co., Inc.

**TELLURIDE IRON WORKS CO.**

Tisco—see Taylor-Wharton Iron &

Steel Co.

**TRAYLOR ENG. AND MFG. CO.**

Universal Dredge Mfg. Co.

Universal Engineering Corp.

Washington Machinery Co.

### REVOLVING

**CONCENO—SEE DEISTER CONCENTRATOR CO.**

**DEISTER CONCENTRATOR CO. LINK-BELT CO.**

### Table

**ALLIS-CHALMERS MFG. CO. INDUSTRIES GROUP**

Carpo Mfg. Inc.

Chain Belt Co.

**CONCENO—SEE DEISTER CONCENTRATOR CO.**

Continental Gin Co.

**DEISTER CONCENTRATOR CO.**

General Electric Co. Ltd., The

**HARDINGE CO., INC.**

Humboldt, Klockner-Humboldt-

Deutz, A. G.

**LINK-BELT CO.**

Pulva Corp.

Rex—see Chain Belt Co.

**TRAYLOR ENG. & MFG. CO.**

### REAGENT

Clarkson Co., The

Com-Bin—see Pulva Corp.

**DENVER EQUIPMENT CO.**

**EQUIPMENT ENGINEERS INC.**

Feedorator—see Fischer & Porter Co.

Fischer & Porter Co.

Galigher Co., The

Geary—see Galigher Co., The

Geary Junior—see Galigher Co., The

Gibson, W. W.

Humboldt, Klockner-Humboldt-

Deutz, A. G.

**INFILCO, INC.**

JEFFREY MANUFACTURING CO.

Klockner-Humboldt-Deutz, A. G.

**LINK-BELT CO.**

MASSCO-DAM—**SEE MINE & SMELTER SUPPLY CO.**

**MINE & SMELTER CO.**

Minerals et Metaux

Morse Bros. Machinery Co.

Wedag, A.G.

**WESTERN MACHY. CO.**

### VIBRATING

Bin-Dictator Co., The

Carrier Conveyor Corp.

**LINK-BELT CO.**

Morgordshammar Mek. Verkstads A.B.

Simplicity Eng. Co.

**SYNTRON CO.**

### FILTER MEDIA

Aloxite—see Carborundum Co., The

American Air Filter Co. Inc.

Burwell—see Minerals Eng. Co.

Celite—see Johns-Manville

Cleveland Wire Cloth & Mfg. Co., The

Carbon—see Carbon

Carbon—see Carbon

Dicalite Div., Great Lakes Carbon Corp.

**DORR-OLIVER INC.**

Elmco Corp., The

Filtration Engineers Div.

Filtration Engineers Div., Ameri-

can Machine & Metals, Inc.

Filter Fabrics, Inc.

Johns-Manville Sales Corp.

Ludlow-Saylor Wire Cloth Co.

National Filter Media Corp.

NFM—see National Filter Media Corp.

Norton Company

Pendleton Woolen Mills

Peterson Filters & Eng. Co.

**GARDNER-DENVER CO.**

**INFILCO, INC.**

Roder Blackburn International Corp.

Saracco Tank & Welding Co., P. G.

Schoonmaker Co., Inc., P. G.

Tamping Bag Co., The

Thor Power Tool Co.

U. S. Hoffman Machinery Corp.

Winslow-Weld—see Winslow Eng.

& Mfg. Co.

Winslow & Mfg. Engineering Co.

### FIRE BRICKS

**See Also Refractories**

**BABCOCK & WILCOX CO., THE**

Carborundum Co., The

Johns-Manville Sales Corp.

Kaiser Aluminum & Chem. Corp.

Mexico Refractories Co.

Robinson Clay Prod. Co., The

Utah Fire Clay Co.

### FIRST AID SUPPLIES

**See Safety Equipment**

### FLOTATION MACHINES

Agitair—see Galigher Co., The

Amay-Hilpert-Pegnitzhutte A.G.

**BOOTH CO., INC.**

FAGERGREN & STEFFENSENS

—SEE WESTERN MACHINERY CO.

Fraser & Chalmers

Galigher Co., The

Humboldt, Klockner-Humboldt-

Deutz, A. G.

**INFILCO, INC.**

JETAIR—**SEE MORSE BROS.**

**MACHINERY CO.**

Klockner-Humboldt-Deutz, A. G.

Knapp & Bates, Ltd.

Krupp, Fried, Maschinen und Stahlbau Rheinhause

**MINE & SMELTER SUPPLY CO., THE MARCY MILL DIV.**

Minemet—see Minerais et Metaux

Minerais et Metaux

**MORSE BROS. MACHINERY CO.**

**NATIONAL TANK & PIPE CO.**

Santa Fe Tank Div., Fluor Products Co.

**STEARNS ROGER MFG. CO.**

U. S. Hoffman Mach. Corp.

**WEMCO-FAGERGREN—SEE WESTERN MACH. CO.**

**WESTERN MACHINERY CO.**

Westinghouse Electric Corp., Sturtevant Div.

**WINGATE**

**WILCOX**

**WILLIAMS**

**WILSON**

**WILSON**</

## Grinding Equipment

### GAUGES

Air Reduction Sales Co.  
Aldon Co.  
Beckman Instruments, Inc.  
Bristol Co., The  
Foxboro Co., The  
General Electric Co., International  
Lufkin Rule Co.  
Lunkenheimer Co., The  
Matheson Co., Inc.  
Minneapolis-Honeywell Regulator Co.  
Norwood Controls Unit  
Weston Electrical Instrument Corp.

### GEAR MOTORS

See Motors

### GEARS

See also Speed Changers; Open Gearing; Drives; Shaft Mounted Drives  
**AMERICAN BRAKE SHOE CO.**, AMER. MANGANESE STEEL DIV.  
**AMSCO**—SEE AMERICAN BRAKE SHOE CO.  
Bedinson Mfg. Co.  
**BROWN, INC.**, DAVID  
Brown Industries, David  
Christian Engineers, J. D.  
Cleveland Worm & Gear Co., The  
Coeur d'Alene Hardware & Foundry Co.  
**COLUMBIA STEEL CASTING CO.**, INC.  
Conveyor Co., The  
**DEMAG AKTIENGESELLSCHAFT**  
Dodge Mfg. Corp.  
Falls Corp., The  
Farrel-Birmingham Co., Inc.  
Federal Motor Truck Co.—Div. of Napco Industries, Inc.  
Gatke Corp.  
General Electric Co., International HEWITT-ROBBINS, INC.  
Jeffrey Manufacturing Co.  
**LINK-BELT CO.**  
Napco Industries Inc.  
Ohio Gear Co.  
Philadelphia Gear Works, Inc.  
Salzgitter Maschinen Aktiengesellschaft  
Schoonmaker Co., Inc., P. G.  
**STEARNS-ROGER MFG. CO.**, THE STEPHENS ADAMSON MFG. CO.  
Taylor-Wharton Iron & Steel Co.  
Tool Steel Gear & Pinion Co., The  
Universal Gear Works, Inc.  
Vulcan Iron Works, (Pa.)  
Walker Bros. (Wigan) Ltd.  
Western Foundry Co.  
Western Gear Corp. (Calif.)  
Western Gear Corp. (Wash.)  
Western Gear Corp.—Pacific Gear Plant  
Westinghouse Electric Corp.  
**WESTINGHOUSE ELECTRIC INTERNATIONAL CO.**  
Worthington Corp.  
Yuba Manufacturing Co.

### GEIGER & SCINTILLATION COUNTERS

See also Exploration Equipment  
Allied Geophysics  
Alpine Laboratories, Ltd.  
Atomic Engineering Corp.  
Babbel—see Uranium Eng. Co.  
Braun-Knecht-Heimann Co.  
Carco Mfg. Inc.  
**COLORADO ASSAYING CO.**  
Custom—see Precision Radiation Instruments  
De Luxe—see Precision Radiation Instruments  
Detector Corp.  
Eberline Inst. Div., Reynolds Elect. & Eng. Co.  
Electro-Technical Labs.  
El-Tronics, Inc.  
Engineers Syndicate, Ltd.  
Fisher Research Lab., Inc.  
Gammacat—see Atomic Engineering Corp.  
**GENERAL ELECTRIC CO.**, INTERNATIONAL  
Hyson Aerial Survey, Inc.  
Junction Bit & Tool Co.  
La Roe Instruments, Inc.  
Menlo Research Lab.  
Mt. Sopris Inst. Corp.  
Nuclear-Chicago Corp.  
Nucleonic Corp. of America  
Philippe Electronics, Inc., Instruments Div.

Pick Laboratories  
Precision Radiation Instruments, Inc.  
Professional—see Precision Radiation Inst.  
Radiac Co., Inc., The  
Snoper—see Precision Radiation Inst.  
Snyders Mine & Chemical Lab.  
Special—see Precision Radiation Inst.  
Standard—see Precision Radiation Inst.  
Technical Associates  
Tracerlab, Inc.  
Universal Atomics  
Uranium Engr. Co.  
Uranium Enterprises  
Ultra Violet Prod., Inc.  
Victoreen Instrument Co.  
Western Radiation Lab.  
White's Electronics

### GENERATORS

See Electrical Equipment

### GEOPHYSICAL SURVEYS

See Exploration Services

### GIANTS

See Monitors

### GRADERS

ADAMS—SEE LE TOURNEAU-WESTINGHOUSE CO.  
**ALLIS-CHALMERS MANUFACTURING CO.**, CONST. MACHY. DIV.  
**ALLIS-CHALMERS MFG. CO.**, INDUSTRIES GROUP  
AUSTIN-WESTERN—SEE BALDWELL-WIN-LIMA-HAMILTON CORP.  
Caterpillar Tractor Co.  
Exxon Company, The  
Haiss Mfg. Co., Inc.  
Huber Warco Co.  
**LE TOURNEAU-WESTINGHOUSE CO.**  
Pettibone Mulliken Corp.  
Speedgrader—see Pettibone Mulliken Corp.  
Yuba Consolidated Industries, Inc.

### GRINDERS

See Sharpeners, Rock Bit

### GRINDING EQUIPMENT

**BALL MILLS**  
**ALLIS-CHALMERS MFG. CO.**, INDUSTRIES GROUP  
BABCOCK & WILCOX CO.  
BALLPEB—SEE ALLIS-CHALMERS MFG. CO.  
Coeur d'Alene Hardware & Foundry Co.  
COMPER—SEE ALLIS-CHALMERS MFG. CO.  
DENVER EQUIPMENT CO.  
EIMCO CORP., THE  
Esch-Werke, K. G.  
Foster Wheeler Corp.  
Fraser & Chalmers Eng. Wks.  
Galigher Co.  
Krupp, Fried. Maschinen und Stahlbau Rheinhausen  
Gibson, W. W.  
**HARDINGE CO. INC.**  
Hirsch Bros. Machinery Co.  
Humboldt, Klockner-Humboldt-Deutz, A. G.  
International Combustion, Ltd.  
International Engr., Inc.  
**KENNEDY-VAN SAUN MFG. & ENG. CORP.**  
Klockner-Humboldt-Deutz, A. G.  
International Combustion, Ltd.  
International Engr., Inc.  
**MINE & SMELTER SUPPLY CO.**, NORDBERG MANUFACTURING CO.  
Saracco Tank & Welding Co.  
**SMITH & CO.**, F. L.

**KENNEDY-VAN SAUN MFG. & ENG. CORP.**  
Klockner-Humboldt-Deutz, A. G.  
Knapp & Bates, Ltd.  
**LAKE SHORE, INC.**  
LIVE ROLLER MILLS MFG. CO.  
**MARCY**—SEE MINE & SMELTER SUPPLY CO., THE  
McNally Pittsburgh Co.  
**MINE & SMELTER SUPPLY CO.**, MINERS FOUNDRY & MFG. CO.  
**MORSE BROS. MACHINERY CO.**, NORDBERG MFG. CO.  
**RIB-CONE**—SEE STRAUB MFG. CO., INC.  
**SMITH & CO.**, F. L.  
**STEARNS-ROGER MFG. CO.**, Straub Mfg. Co., Inc.  
Thunes Mek. Verksted, A. S.  
**TRAYLOR ENG. & MFG. CO.**, U. S. STEEL CORP.

### ROD MILLS

**ALLIS-CHALMERS MFG. CO.**, INDUSTRIES GROUP  
BETHLEHEM PACIFIC COAST STEEL CORP.  
**COLORADO FUEL & IRON CORP.**

**DENVER EQUIPMENT CO.**

**DRAVO CORP.**

**EIMCO CORP., THE**

General Electric Co. Ltd., The Gibson, W. W.

**HARDINGE CO. INC.**, HEAD WRIGHTSON, STOCKTON FORGE, LTD.

Humboldt, Klockner-Humboldt-

Deutz, A. G.

International Combustion, Ltd.

**KENNEDY-VAN SAUN MFG. & ENG. CORP.**

Klockner-Humboldt-Deutz, A. G.

LIVE ROLLER MILLS MFG. CO.

**MARCY**—SEE MINE & SMELTER SUPPLY CO.

**MINE & SMELTER SUPPLY CO.**, MINERS FOUNDRY & MFG. CO.

**MORSE BROS. MACHINERY CO.**, NORDBERG MFG. CO.

**STEARNS-ROGER MFG. CO.**

Thunes Mek. Verksted, A. S.

**TRAYLOR ENG. & MFG. CO.**

### BALLS

**ACF Industries, Inc.**, American Car & Foundry Div.

**ALLIS-CHALMERS MFG. CO.**, ALLIS-CHALMERS MFG. CO., INDUSTRIES GROUP

**AMERICAN BRAKE SHOE CO.**, American Forge Co.

**BABCOCK & WILCOX CO.**, THE Bethlehem Steel Co.

Bethlehem Steel Export Corp.

C F & I—SEE COLORADO FUEL & IRON CORP., THE

Calumet & Hecla, Inc., Calumet Div.

Coeur d'Alene Hardware & Foundry Co.

**COLORADO FUEL & IRON CORP.**, THE

Concavex—SEE ALLIS-CHALMERS MFG. CO.

Firth Sterling, Inc.

Foster Wheeler Corp.

General Motors Corp., New Departure Divs.

**HADFIELD'S LTD.**

Hardinge Co., Inc.

Head Wrightson, Stockton Forge, Ltd.

International Combustion Ltd.

**KENNAMETAL, INC.**

**KENNEDY-VAN SAUN MFG. & ENG. CORP.**

Klockner-Humboldt-Deutz, A. G.

Knapp & Bates, Ltd.

**MARCY**—SEE MINE & SMELTER SUPPLY CO.

**MINE & SMELTER SUPPLY CO.**, NATIONAL MALLEABLE & STEEL CASTINGS CO.

Ni Hardree Calumet & Hecla, Inc., Calumet Div.

**SHEFFIELD DIV.**, ARMCO STEEL CORP.

S. K. F. Industries Inc.

**U. S. STEEL CORP.**, COLUMBIA-GENEVA STEEL DIV.

USS—SEE U. S. STEEL CORP.

UNITED STATES STEEL EXPORT CO.

Western Foundry Co.

### PEBBLE MILLS

**ALLIS-CHALMERS MFG. CO.**, INDUSTRIES GROUP

**DENVER EQUIPMENT CO.**

**DRAVO CORP.**

**EIMCO CORP., THE**

Esch-Werke, K. G.

Foster Wheeler Corp.

Fraser & Chalmers Eng. Wks.

Gaigher Co.

Krupp, Fried. Maschinen und Stahlbau Rheinhausen

Gibson, W. W.

**HARDINGE CO. INC.**

Hirsch Bros. Machinery Co.

Humboldt, Klockner-Humboldt-

Deutz, A. G.

**KENNEDY-VAN SAUN MFG. & ENG. CORP.**

Klockner-Humboldt-Deutz, A. G.

Knapp & Bates, Ltd.

**LAKE SHORE, INC.**

**MARCY**—SEE MINE & SMELTER SUPPLY CO.

**MINE & SMELTER SUPPLY CO.**, MINERS FOUNDRY & MFG. CO.

**NORDBERG MANUFACTURING CO.**

Saracco Tank & Welding Co.

**SMITH & CO.**, F. L.

**TRAYLOR ENG. & MFG. CO.**

### TUBE MILLS

**ALLIS-CHALMERS MFG. CO.**, INDUSTRIES GROUP

**BETHLEHEM PACIFIC COAST STEEL CORP.**

Bethlehem Steel Export Corp.

C F & I—SEE COLORADO FUEL & IRON CORP., THE

**COLORADO FUEL & IRON CORP.**

**HARDINGE CO. INC.**

Head Wrightson, Stockton Forge, Ltd.

Humboldt, Klockner-Humboldt-

Deutz, A. G.

**KENNEDY-VAN SAUN MFG. & ENG. CORP.**

Klockner-Humboldt-Deutz, A. G.

Knapp & Bates, Ltd.

**LAKE SHORE, INC.**

**MARCY**—SEE MINE & SMELTER SUPPLY CO.

**MINE & SMELTER SUPPLY CO.**, MINERS FOUNDRY & MFG. CO.

**NORDBERG MFG. CO.**

Saracco Tank & Welding Co.

**SMITH & CO.**, F. L.

Staub Mfg., Inc.

Thunes Mek. Verksted, A. S.

**TRAYLOR ENG. & MFG. CO.**

### LINERS

**ALLIS-CHALMERS MFG. CO.**, INDUSTRIES GROUP

**AMERICAN BRAKE SHOE CO.**, AMER. MANGANESE STEEL DIV.

**AMSCO**—SEE AMERICAN BRAKE SHOE CO.

**BABCOCK & WILCOX CO.**, THE

Calumet & Hecla, Inc., Calumet

Div.

Coeur d'Alene Hardware & Foundry Co.

**COLUMBIA STEEL CASTING CO.**, INC.

**DENVER EQUIPMENT CO.**

**EIMCO CORP., THE**

**ELECTRIC STEEL FOUNDRY CO.**

**Manufacturer's Complete Names and Addresses are listed in Section II, last pages of this yellow section. Firms appearing in boldface caps carry advertisements in this issue.**

## Grizzlies

Gatke Corp.  
Georgia Iron Works  
MADFIELDS LTD.  
HARDINGE CO., INC.  
HEAD WRIGHTSON, STOCKTON  
FORGE LTD.  
International Combustion, Ltd.  
KENNEDY-VAN SAUN MFG. &  
ENG. CORP.  
Knapp & Bates, Ltd.  
MARCY—SEE MINE & SMOLETER  
SUPPLY CO., THE  
MCCLANAHAN & STONE CORP.  
MINE & SMOLETER SUPPLY CO.  
MINERS FOUNDRY & MFG. CO.  
NATIONAL MALLEABLE &  
STEEL CASTING CO.  
Ni-Hard—see Calumet & Hecla, Inc.  
Calumet Div.  
Sanford-Day Iron Works Inc.  
SMITH & CO., F. L.  
Straus Mfg. Co., Inc.  
Taylor-Wharton Iron & Steel Co.  
TAYLOR ENG. & MFG. CO.  
USS—SEE U.S. STEEL CORP.  
UNITED STATES STEEL EXPORT  
CO.  
U. S. STEEL CORP., COLUMBIA-  
GENEA DIV.  
Washington Iron Works  
Western Foundry Co.

## PULVERIZERS

Majac, Inc.

## GRIZZLIES

See Screens, Grizzlies and  
Accessories

## GROUTING

See also Concreting Equipment  
EQUIPMENT

Air Placement Equip. Co.  
Air Place—see Air Placement  
Equip. Co.  
CEMENT GUN CO.  
CHICAGO PNEUMATIC TOOL CO.  
Cementation Co., Ltd., The  
DIAMOND DRILL CONTRACT-  
ING CO.  
DRAVO CORP.  
Grout or Blast—see Air Placement  
Equip. Co.  
Guns—see Air Placement Equip.  
INTERNATIONAL B. F. GOOD-  
RICH  
Koehring Co.  
LONGYEAR CO., E. J.  
MAYO TUNNEL & MINE EQUIP-  
MENT MOBILE DRILLING,  
INC.  
MORE BROS. MACHINERY CO.  
Pendrill—see Pennsylvania Drilling  
Co.  
Pennsylvania Drilling Co.  
SPRAGUE & HENWOOD, INC.  
Thor Power Tool Co.  
Torkret G.m.b.H.

## SERVICES

Cementation Co., Ltd., The  
DIAMOND DRILL CONTR. CO.  
McKenzie & Whittle Contractors  
Minerals Engr. Co.  
MOBILE DRILLING INC.

## HARD FACING

See Welding Equipment  
and Supplies

## HATS

See Safety Equipment

## HAULAGE UNITS, OFF-RAIL

See also Truck and Trailers,  
Self Loading Transport

ALLIS-CHALMERS MFG. CO.,  
CONSTRUCTION MACHY.  
DIV.  
Autocar—see The White Motor Co.,  
Autocar Trucks Div.  
DART TRUCK CO.  
Easton Car & Construction Co.  
EUCLID DIVISION, GENERAL  
MOTORS CORP.  
Federal Motor Truck Co.  
Four Wheel Drive Auto Co., The

Fruhauf—see Fruhauf Trailer Co.  
Fruhauf Trailer Co.  
Galion Allsteel Body Co.  
GENERAL MOTORS CORP.,  
EUCLID DIV.  
GENERAL MOTORS OVERSEAS  
OPERATIONS  
GETMAN BROTHERS  
GETMAN SHUTTLE CARS—SEE  
GETMAN BROS.  
Gismo—see Sanford Day Iron  
Works Inc.

Goodman Mfg. Co.  
Heil Co., The  
Howe Scale Co.  
INTERNATIONAL HARVESTER  
CO.

Jeffrey Mfg. Co., The  
JOY MANUFACTURING TRUCK  
CO.

Koehring Co.  
Landis Steel Co.  
LE TOURNEAU-WESTINGHOUSE  
CO.

Napco Industries, Inc.  
Sandor-Day Iron Works, Inc.

SCOOT-CRETE—SEE GETMAN  
BROS. MFG. DIV., INC.

TOURNAHOPPER—SEE LE  
TOURNEAU-WESTING-  
HOUSE CO.

TOURNAPULL—SEE LE TOUR-  
NEAU-WESTINGHOUSE CO.

TOURNAROCKER—SEE LE  
TOURNEAU-WESTING-  
HOUSE CO.

Westinghouse Air Brake Co., Le  
Roi Div.

White Motor Co., Autocar, Trucks

Div.

Wooldridge Mfg. Div., Continental  
Copper & Steel Industries, Inc.

## HEADFRAMES

### STEEL

ALLISON STEEL MFG. CO.,  
Connellsville Mfg. & Mine Supply  
Co.

DEMAG AKTIENGESELLSCHAFT  
HACK ENG. CO.  
HEAD WRIGHTSON, STOCKTON  
FORGE, LTD.

Humboldt, Klockner-Humboldt-  
Deutz, A. G.

LAKE SHORE, INC.

MAYO TUNNEL & MINE EQUIP.

NATL. IRON CO.

Oilwell Iron Works Co.

Silent Glow Oil Burner Corp.

TELLURIDE IRON WKS.

Universal Dredge Mfg. Co.

Washington Iron Wks.

### TIMBER

Koppers Co., Inc.

## HEATERS

### AIR

American Air Filters Co., Inc.  
Carrier Corp.

Cutter-Hammer, Inc.

DRAVO CORP.

Foster Wheeler Corp.

General Electric Co., Apparatus

Sales Div.

GENERAL ELECTRIC CO., IN-  
TERNATIONAL

GRAYBAR ELECTRIC CO., INC.

Grinnell Co., Inc.

International Combustion Ltd.

Klockner-Humboldt-Deutz, A. G.

Loesche, Germany

Mosebach Electric & Supply Co.

Saracco Tank & Welding Co.

Silent Glow Oil Burner Corp.

Surface Combustion Corp.

Thermoller—see Grinnell Co., Inc.

USCO—see International Combus-

tion Ltd.

Vulcan Electric Co.

Watlow Elec. Mfg. Co.

WESTINGHOUSE ELECTRIC

INTERNATIONAL CO.

Westinghouse Electric Corp., Stur-

tevant Div.

### SPACE

American Air Filter Co., Inc.

American Blower Corp.

Carrier Corp.

Cutter-Hammer Inc.

DRAVO CORP.

General Electric Co., Apparatus

Sales Div.

General Electric Co., International

GRAYBAR ELECTRIC CO., INC.

Iron Fireman Mfg. Co.

Mosebach Elec. & Supply Co.

Saracco Tank & Welding Co.

Silent Glow Oil Burner Corp.

Surface Combustion Corp.  
U. S. Rubber Co.  
Watlow Electric Mfg. Co.  
Westinghouse Electric Corp.,  
Sturtevant Div.

WESTINGHOUSE ELECTRIC  
INTERNATIONAL CO.

## HOISTING CABLE

See Rope, Wire

## HOIST COMMUNICATIONS

See Communications

## HOIST CONTROLS and SAFETY EQUIPMENT

Bullard Co., E. D.  
LILLY—SEE LOGAN ENGR. CO.  
LOGAN ENGR. CO.  
SIMPLEX—SEE LOGAN ENGR.  
CO.

## HOISTING EQUIPMENT

See also Chain Hoists; Rope,  
Wire

### AUTOMATIC SKIP LOADING DEVICES

ASEA, SWEDEN  
CONNELLSVILLE MFG. & MINE  
SUPPLY CO.  
DEMAG AKTIENGESELLSCHAFT  
Hirsch Bros. Mfg. Co.  
LINK-BELT CO.  
Odgen Iron Works Co.

### FRiction HOISTS

American Hoist & Derrick Co.  
ASEA ELECTRIC INC.  
ASEA, SWEDEN  
BLACK'S MINING EQUIPMENT,  
LTD.  
Clyde Iron Works, Inc.  
CONNELLSVILLE MFG. & MINE  
SUPPLY CO.  
Duff-Norton Co.  
Eisenhut Prinz Rudolph, A.G.  
MAYO TUNNEL & MINE EQUIP-  
MENT  
Washington Iron Works

### MINE SHAFT HOISTS

ASEA, SWEDEN  
Bodinson Mfg. Co.  
Clyde Iron Wks., Inc.  
Coeur d'Alene Hardware & Foundry  
Co.  
CONNELLSVILLE MFG. & MINE  
SUPPLY CO.

DEMAG AKTIENGESELLSCHAFT  
Eisenhut Prinz Rudolph, A.G.  
Electric Controller & Mfg. Co.  
Fraser & Chalmers Eng. Wks.  
GARDNER-DENVER CO.

General Electric Co., Ltd., The  
Gregg Co., Ltd.  
Hirsch Bros., Machinery Co.  
INGERSOLL-RAND CO.

JOY MANUFACTURING CO.  
Kema (Kohn-Ehrenfelder Maschin-  
enbau-Anstalt)

LAKE SHORE, INC.  
NORDBERG MFG. CO.  
Ohio Hoist & Mfg. Co.

Rogers Iron Works Co.  
Shepard Niles Crane & Hoist Corp.  
STEARNS ROGER MFG. CO.

TELLURIDE IRON WKS.  
VULCAN-DENVER—SEE VUL-  
CAN IRON WORKS, DEN-  
VER, CO.

VULCAN IRON WORKS (DEN-  
VER)  
Washington Iron Works

American Hoist & Derrick Co.

ATLAS COPCO PACIFIC, INC.

ATLAS COPCO, A. B., SWEDEN

Brownie—see Sanford Day Iron

Works, Inc.

Cecalt S. A.—See Gripohist, Inc.

CHICAGO PNEUMATIC TOOL CO.

Clyde Iron Wks.

Consolidated Pneumatic Tool Co.,  
Ltd.

Dunbrach, G. Fabrik für Bergwerks-  
bedarf, G.m.b.H.

GARDNER-DENVER CO.

GRIPHOIST, INC.

HARNISCHFEGER CORP.

Hasenclever (Maschinenfabrik) A.G.

Holman Bros., (Canada) Ltd.

Hopkinson & Co., Ltd., Austin

INGERSOLL-RAND CO.

JOY MANUFACTURING CO.

LEDEEN MFG. CO.

Lug-All Co., The

Mixermobile Mfg. Inc.

National Supply Co. (Pa.)

Ohio Hoist & Mfg. Co.

Princeton Gripohist, Inc.

Round Chain Co's.

Sanford Day Iron Wks.

Scoopmobile—see Mixermobile Mfg.

Inc.

Shepard Niles Crane & Hoist Corp.

Uhden, Inc.

VULCAN-DENVER—VULCAN

IRON WORKS, DENVER,

COLO.

Vulcan Iron Works (Pa.)

## Stationary

American Chain & Cable Co., Inc.,  
Wright Hoist Div.

American Hoist & Derrick Co., Inc.

ATLAS COPCO, A. B., SWEDEN

ATLAS COPCO EASTERN, INC.

ATLAS COPCO PACIFIC, INC.

Beebe Bros.

Clyde Iron Wks., Inc.

Eisenhut Prinz Rudolph, A.G.

Eisenwerke Mülheim Meiderich,  
A.G.

Gar Wood Industries, Inc.

Greco, Co., Ltd.

HARNISCHFEGER CORP.

INGERSOLL-RAND CO.

JOY MANUFACTURING CO.

LAKE SHORE INC.

NATIONAL IRON CO.

National Supply Co. (Pa.)

Ohio Hoist & Mfg. Co.

Round Chain Co's.

Sanford Day Iron Wks.

SAUERMAN BROS., INC.

Shepard Niles Crane & Hoist Corp.

STEARNS-ROGER MFG. CO.

Uhden, Inc.

VULCAN-DENVER—SEE VUL-  
CAN IRON WORKS, DEN-  
VER, CO.

VULCAN IRON WORKS (DEN-  
VER)

Washington Iron Works

## SKIPS AND CAGES

ALLISON STEEL MFG. CO.

AMERICAN BRAKE SHOE CO.,  
AMER. MANGANESE STEEL

DIV.

AMSCO—SEE AMERICAN BRAKE

SHOE

ASEA, SWEDEN

ATLAS CAR & MFG. CO., THE

Bodinson Mfg. Co.

CARD IRON WORKS CO., THE

C. S.

Clyde Iron Works, Inc.

CONNELLSVILLE MFG. & MINE

SUPPLY CO.

DEMAG AKTIENGESELLSCHAFT

Easton Car & Construction Co.

Gregg Co., Ltd.

HACK ENGINEERING CO.

HEAD WRIGHTSON, STOCKTON  
FORGE, LTD.

Hirsch Bros., Machinery Co.

JETO-SKIP—SEE LAKE SHORE,  
INC.

LAKE SHORE, INC.

MAYO TUNNEL & MINE EQUIP.

MINERS FOUNDRY & MFG. CO.

NATIONAL IRON CO.

Nolan Co., The

NORDBERG MFG. CO.

Ogden Iron Works Co.

Ohio Hoist & Mfg. Co.

Rogers Iron Works Co.

Sanford-Day Iron Works Inc.

STEARNS ROGER MFG. CO.

TELLURIDE IRON WORKS CO.

Universal Dredge Mfg. Co.

VULCAN-DENVER—SEE VUL-  
CAN IRON WORKS, DEN-  
VER, COLORADO

## Keep

ASEA

Eisenhut Prinz Rudolph, A.G.

## SCRAPER HOISTS (slushers) Portable

American Chain & Cable Co., Inc.

Wright Hoist Div.

## Locomotives

VULCAN IRON WORKS (COLO.)  
Vulcan Iron Works (Pa.)  
Wellman Engineering Co., The

### HOSE

Air Reduction Sales Co.  
American Rubber Mfg. Co.  
**ATLAS COPCO**, A. B., SWEDEN  
**ATLAS COPCO EASTERN, INC.**  
**ATLAS COPCO PACIFIC, INC.**  
Band-it Co.  
Bear—see American Rubber Mfg. Co.  
Boston Woven Hose & Rubber Co.  
Buck & Associates, Carl  
Carlyle Rubber Co., Inc.  
Carmic—see Carl Buck & Associates  
Champ—see Hose Accessories Co.,  
Champ Industries Div.  
**CHICAGO PNEUMATIC TOOL CO.**  
Condor—see Raybestos-Manhattan,  
Inc.  
Clearstream-Garden—see Yardley  
Plastics Co.  
Crackerjack—see American Rubber  
Mfg. Co.  
Drillard Co., Howard  
Eimco Corp., The  
Gates Rubber Co., The  
Goodall Rubber Co.  
Goodrich Co., B. F., Industrial  
Prod. Div.  
Goodyear Tire & Rubber Co.  
**HEWITT-ROBINS, INC.**  
Hose Accessories Co., Champ In-  
dustries Div.  
Industrial Air Prod. Co.  
**INTERNATIONAL B. F. GOOD-  
RICH**  
Lee Rubber & Tire Corp., Republic  
Rubber Div.  
Porter Co., H. K., Quaker Rubber  
Div.  
Quaker Pioneer Rubber Mills  
Raybestos-Manhattan, Inc.  
Straloflex Inc.  
Stewart-Warner Corp.  
Tampico Bag Co., Div., Pickard  
Industries, Inc.  
**ATHERMID CO.**  
Thor Power Tool Co.  
United States Rubber Co.  
U. S. Rubber Inc.  
Yardley Plastics Co.  
Yosemite—see American Rubber  
Mfg. Co.

### HYDROSEPARATORS

See Thickeners and Tanks;  
Classifiers

### IDLERS

See Conveyor Equipment

### INCREASERS, SPEED

See Speed Changers

### INSTRUMENTS

See Engineering Supplies; Sur-  
veying Instruments; Testing and  
Control Equipment

### ION EXCHANGE RESINS

See Reagents and Chemicals

### JIGS

See Concentrating Equipment

### JIM CROWS

See Track and Accessories

### JUMBOS

See Drills, Rack

### KILNS

See Dryers and Kilns; Coolers

## LABORATORIES AND ASSAYERS

Agence Miniere & Maritime S. A.  
ARIZONA TESTING LABORA-  
TORIES  
Bennets Chemical Laboratory, Inc.  
**BLACK & DEASON**  
BOOTH CO., INC.  
Braun-Knecht-Heimann Co.  
Carpeo Mfg. Inc.  
Central Scientific Co. of Calif.  
**CHAPMAN AND WOOD**  
Charlton Laboratories  
**COLORADO ASSAYING CO., THE**  
Custom Assay Office  
Deason & Nichols  
**DEGGENDORFER, T. G.**  
**DENVER EQUIPMENT CO.**  
**DICKINSON LABORATORIES,**  
INC.  
El Paso Testing Laboratories  
Engineers Syndicate, Ltd.  
Galigher Co., The  
**GOODALL BROS.**  
Hanks, Inc., Abbott A.  
**HAWLEY & HAWLEY**  
Imperial Chemical Industries, Ltd.  
Junction Bit & Tool Co.  
**KENNEDY-VAN SAUN MFG. &**  
ENG. CORP.  
Knapp & Bates, Ltd.  
Lerch Bros., Inc.  
Mack, Peter  
Menlo Research Lab.  
Minerals Engineering Co. (Calif.)  
Minerals Engineering Co. (Colo.)  
Minerals Laboratory  
Mobile Drilling, Inc.  
**ORE RESEARCH & LABORA-  
TORIES**  
Osborne Laboratories, Inc., Ray-  
mond G.  
Philips Electronics, Inc., Instru-  
ments Div.  
**REED ENGINEERING**  
Research Inc.  
Root & Simpson, Inc.  
**SMITH-EMERY CO.**  
Snell Inc., Foster D.  
**SOUTHERN SPECTROGRAPHIC**  
LABORATORY  
Stearns Magnetic, Inc.  
Stowell & Co., W. H.  
**STURTEVANT MILL CO.**  
Twining Laboratories, The  
Udy, Marvin J.  
**WOOD ASSAYING CO., HENRY E.**  
Menlo Research Laboratory  
MINE & SMELTER SUPPLY CO.  
THE MARCY MILL DIV.  
Nucleonic Corp. of America  
Rapid Magnetic Machines, Ltd.  
Snyder's Mine & Chemical Lab  
**STURTEVANT MILL CO.**  
Thompson Balance Co.  
Ultra-Violet Products

## LABORATORY EQUIPMENT AND SUPPLIES

See also Reagents and  
Chemicals

### Laboratory and Testing Machines

Agitair—see Galigher Co., The  
Ainsworth & Sons, Inc., Wm.  
Ainsworth Balances—see Ainsworth  
& Sons, Inc.  
**BALDWIN-LIMA-HAMILTON**  
CORP.  
Bausch & Lomb Optical Co.  
Beckman Instruments, Inc., Sci-  
entific Instruments Div.  
Bico, Inc.  
**BOOTH CO., INC.**  
Braun-Knecht-Heimann Co.  
Carpeo Mfg., Inc.  
Central Scientific Co. of Calif.  
**DENVER FIRE CLAY CO.**  
Detector Corp.  
**DFC—SEE DENVER FIRE CLAY**  
CO., THE  
**ENGINEERS SYNDICATE, LTD.**  
GALIGHER CO.  
**GENERAL ELECTRIC CO., IN-**  
TERNA  
General Mach. Co.  
**HARDINGE CO., INC.**  
**HUMPHREYS INVESTMENT CO.**  
International Combustion Ltd.  
International Eng. Inc.  
Kenton—see Torsion balance Co.,  
The  
Knapp & Bates, Ltd.  
Ledoux & Co.  
Lerlab Supply Co.  
MacBeth Inst. Corp.  
**MASSCO—SEE MINE & SMELT-**  
ER SUPPLY CO.

Menlo Research Laboratory  
MINE & SMELTER SUPPLY CO.  
Minerais et Metaux  
Morgordshammar Mek. Verkstads  
A.B.

**MORSE BROS. MACHINERY CO.**

Philips Electronics, Inc., Instru-  
ments Div.

Photovolt Corp.

Porter Co., Inc., H. K., The, W-S

Fittings Div.

Precision Radiation Inst., Inc.

Pulva Corp.

Rawson Electrical Inst. Co.

**RO-TAP—SEE TYLER CO., THE**

W.S.

Separ Microsplitter Supply

Staplex Co., The

Stearns Magnetic, Inc.

**STURTEVANT MILL CO.**

Thompson Balance Co., The

**TY-LAB—SEE TYLER CO., THE**

W. S.

**TYLER CO., THE W. S.**

Ultra Violet Prod., Inc.

Universal Vibrating Screen Co.

Voland & Sons, Inc.

**WEMCO—SEE WESTERN MA-**

CHINERY CO.

WESTERN MACHINERY CO.

**MISCELLANEOUS LABORATORY**

**SUPPLIES**

Allied Chem. & Dye Corp., General

Chem. Div.

Alpine Laboratories, Ltd.

Baker & Adamson—see Allied

Chemical & Dye Corp., General

Chem. Div.

Bausch & Lomb Optical Co.

Braun-Knecht-Heimann Co.

Carpeo Mfg., Inc.

Carrier Corp.

Central Scientific Co. of Calif.

Combustion Engineering, Inc.

Raymond Div.

**DFC—SEE DENVER FIRE CLAY**

CO.

**DENVER EQUIPMENT CO.**

**DENVER FIRE CLAY CO.**

Engineers Syndicate, Ltd.

Fischer & Porter Co.

Hewitt Electric Co.

Hoffman Bros. Drilling Co.

Industrial Physics & Electronics Co.

International Combustion, Ltd.

Knapp & Bates, Ltd.

Lerlab Supply Company

LINE ROLLER MILLS MFG. CO.

Menlo Research Lab.

**MINE & SMELTER SUPPLY CO.**

**THE MARCY MILL DIV.**

Nucleonic Corp. of America

Rapid Magnetic Machines, Ltd.

Snyder's Mine & Chemical Lab

**STURTEVANT MILL CO.**

Thompson Balance Co.

Ultra-Violet Products

**LACING, BELT**

See Fasteners, Belt

## LAMPS, MINER

See Safety Equipment

## LIGHT PLANTS

See Electrical Equipment

## LIGHTS

See Safety Equipment

## LINERS

See Grinding Equipment

## LOADERS, FRONT

END AND OVERHEAD

See also Tractors and  
Attachments, Self Loading  
Transport

### CRAWLER

Agricat—see Joost Mfg. Co.

**ALLIS-CHALMERS MANUFAC-**

TURING CO., CONST.

**MACHY. DIV.**

**ALLIS-CHALMERS MFG. CO., IN-**

DUSTRIES GROUP

**AMERICAN BRAKE SHOE CO.**

**AMER. MANGANESE STEEL**

**DIV.**

American Tractor Equipment Corp.

**AMSCO—SEE AMERICAN BRAKE**

**SHOE CO.**

**ATLAS COPCO, A. B., SWEDEN**

**AUSTIN-WESTERN—SEE BALD-**

**WIN-LIMA-HAMILTON CORP.**

**BALDWIN-LIMA-HAMILTON**

**CORP.**

**BARKER-GREENE CO.**

Caterpillar Tractor Co.

**DROTT MFG. CO.**

Eimco Corp., The

Goodman Mfg. Co.

**HARNISCHFEGER CORP.**

Hough Co., The, Frank G.

**INTERNATIONAL HARVESTER**

**EXPORT CO.**

Joost Mfg. Co.

**JOY MANUFACTURING CO.**

Lodover—see Service Supply Co.

**MARION POWER SHOVEL CO.**

Merton Engineering Co., Ltd.

Minneapolis-Moline Co.

Oliver Corp., The

Payloader—see Hough Co., The

Frank G.

Pence & Co., Inc., Earl H.

Salzgitter Maschinen Aktiengesell-

schaft

Sanford Day Iron Wks.

Service Supply Corp.

Skid-Shovel—see Drott Mfg. Corp.

Tractomotive Corp.

Tracto-Shovel—see Tractomotive

Corp.

Traxcavator—see Caterpillar Trac-

tor Co.

**VICKERS-ARMSTRONGS (TRAC-**

**TORS) LTD.**

**RAIL (Mucking Machines)**

**AMERICAN BRAKE SHOE CO.,**

**AMER. MANGANESE STEEL**

**DIV.**

**AMSCO—SEE AMERICAN BRAKE**

**SHOE CO.**

**ATLAS COPCO, A. B., SWEDEN**

**AUSTIN-WESTERN—SEE BALD-**

**WIN-LIMA-HAMILTON CORP.**

**BALDWIN-LIMA-HAMILTON**

**CORP.**

Eimco Corp., The

Salzgitter Maschinen Aktiengesell-

schaft

**RUBBER TIRED**

**ADAMS TRAVELOADER—SEE LE**

**TOURNEAU-WESTING-**

**HOUSE CO.**

American Tractor Equipment Corp.

**AUSTIN-WESTERN—SEE BALD-**

**WIN-LIMA-HAMILTON CORP.**

**BARBER-GREENE CO.**

EUCLID DIVISION, GENERAL

**MOTORS CORP.**

HOUGH—SEE INTERNATIONAL

**HARVESTER EXPORT CO.**

Hough Co., Frank G.

**INTERNATIONAL HARVESTER**

**EXPORT CO.**

Jaeger Machine Co., The

Merton Engineering Co., Ltd.

**LE TOURNEAU-WESTINGHOUSE**

**CORP.**

Minneapolis-Moline Co.

Mixermobile Mfg. Inc.

Moto-Loaders—see Thew Shovel

Napco Industries, Inc.

Oliver Corp., The

Payloader—see Hough Co., The

Frank G.

Pettibone Mulliken Corp.

Quaker Pioneer Rubber Mills

Scoopmobile—see Mixermobile Mfg.

Inc.

Speedwell—see Pettibone Mulliken

Corp.

Thew Shovel Co.

Tracto-Loader—see Tractomotive

Corp.

Tractomotive Corp.

Westinghouse Air Brake Co.

Loaders—Mobile Belt Type

**"TRAVELOADER"—SEE LE**

**TOURNEAU - WESTING-**

**HOUSE CO.**

**LOCOMOTIVES**

**BATTERY**

**ASEA, SWEDEN**

## Log Washers

ATLAS CAR & MFG CO., THE  
BALDWIN-LIMA-HAMILTON  
CORP.

English Electric Export & Trading  
Co., Ltd.

Exide Industrial Div. Electric Storage  
Battery Co.

General Electric Co., Apparatus  
Sales Co.

GENERAL ELECTRIC CO., IN-  
TERNATIONAL

Goodman Mfg. Co.

GREENSBURG MACHINE CO.

International General Electric Co.

JEFFREY MANUFACTURING CO.

Mancha Storage Battery Locomotive  
Div., Goodman Mfg. Co.

Thunes Mek. Verksted, A. S.

Vulcan Iron Works (Pa.)

Wood & Co. Ltd., Hugh

Wood & Sons Ltd., John

## COMPRESSED AIR

DEMAG AKTIENGESELLSCHAFT

Eimco Corp., The

HACK ENG. CO.

MAYO TUNNEL & MINE EQUIP.

TRAMAIER—SEE HACK ENG. CO.

Universal Dredge Mfg. Co.

Universal Tramaire—see Universal

Dredge Mfg.

## DIESEL

American Locomotive Co.

FATE-ROOT-HEATH CO., THE

General Electric Co.

GENERAL MOTORS OVERSEAS  
OPERATIONS

GREENSBURG MACH. CO.

Gregg Co. Ltd., The

HACK ENG. CO.

Hunslet Engine Co., Ltd., The

International General Electric Co.

Klockner-Humboldt-Deutz, A. G.

LE TOURNEAU-WESTINGHOUSE  
CO.

Mancha Storage Battery Locomotive  
Div., Goodman Mfg. Co.

MANNESMANN Export G.m.b.H.

MAYO TUNNEL & MINE EQUIP.

Miller Machinery Co.

Mineral Engineering Co. (Colo.)

MIRRLEES, BICKERTON & DAY,  
LTD.

Missoula—see Miller Mach. Co.

MOTOR RAIL, LTD.

National Mine Service Co.

PLYMOUTH LOCOMOTIVE  
WORKS

Rogers Bros. Corp.

Rogers Hydramotive—see Rogers

Bros. Corp.

Ruth Co., The

SWITCHMOBILE—SEE LE TOUR-

NEAU-WESTINGHOUSE CO.

TELLURIDE IRON WORKS CO.

Thunes Mek. Verksted, A. S.

Universal Dredge Mfg. Co.

UNIVERSAL—SEE HACK ENG.

CO.

U.S. Industries, Inc.

Vulcan Iron Works (Pa.)

## DIESEL-ELECTRIC

Alco Products, Inc.

American Locomotive Co.

ATLAS CAR & MFG. CO., THE

Baldwin-Lima-Hamilton Corp.,  
Edisonite

Bron Boer & Cie, A.G.

Differential Steel Car Co.

FATE-ROOT-HEATH CO., THE

General Electric Co., Apparatus

Sales Div.

GENERAL ELECTRIC CO., IN-  
TERNATIONAL

General Motors Corp., Electro-Mo-

tive Div.

GENERAL MOTORS OVERSEAS  
OPERATIONS

GREENSBURG MACHINE CO.

HACK ENGINEERING CO.

International General Electric Co.

MIRRLEES, BICKERTON & DAY,

LTD.

PLYMOUTH—SEE FATE-ROOT-

HEATH CO., THE

PLYMOUTH LOCOMOTIVE  
WORKS

Rogers Bros. Corp.

Rogers Electromotive—see Rogers

Bros. Corp.

Universal Dredge Mfg. Co.

U.S. Industries, Inc.

Vulcan Iron Works (Pa.)

## TROLLEY

ASEA, SWEDEN

ATLAS CAR & MFG. CO., THE

Differential Steel Car Co.  
General Electric Co., Apparatus  
Sales Div.  
GENERAL ELECTRIC CO., IN-  
TERNATIONAL

Goodman Mfg. Co.

INTERNATIONAL GENERAL

ELECTRIC CO.

Jeffrey Manufacturing Co.

National Mine Service Co.

Thunes Mek. Verksted, A. S.

Vulcan Iron Works (Pa.)

WESTINGHOUSE ELECTRIC  
INTERNATIONAL CO.

## MAGNETIC EQUIPMENT

### HEAD PULLEYS AND SUSPENSION MAGNETS

Dings Magnetic Separator Co.

Eries Mfg. Co.

Homer Mfg. Co., The

Humboldt, Klockner-Humboldt-

Deutz, A. G.

Memo—see Magnetic Eng. & Mfg.

Co.

Ohio Electric Mfg. Co.

Rapid Magnetic Machines, Ltd.

F. W. Shadley Co.

Scott-Concentrators

Stearns Magnetic Products Inc.

Thunes Mek. Verksted, A. S.

Wedge, A. G.

Westinghouse Air Brake Co. Le Ro

Div.

WESTINGHOUSE ELEC. INTL.

## GRAYBAR ELECTRIC CO., INC.

Holman Bros. Ltd.

Holman Brothers (Canada) Ltd.

INGERSOLL-RAND CO.

JOY MANUFACTURING CO.

LEDEEN MFG. CO.

MINE & SMELTER SUPPLY CO.

THE MARCY MILL DIV.

PISTONAIR—SEE JOY MFG. CO.

Salzgitter Maschinen Aktiengesell-

schaft

Thor Power Tool Co.

TURBINAIR—SEE JOY MFG. CO.

Westinghouse Air Brake Co. Le Ro

Div.

WESTINGHOUSE ELEC. INTL.

CO.

GEAR MOTORS

All-Motor—see Falk Corp., The

Allis Co., The Louis

ALLIS-CHALMERS MFG. CO.

INDUSTRIES GROUP

BROWN, INC. DAVID

Christian Engineers, J. D.

Coeur d'Alene Hardware & Foundry

Co.

Conveyor Co., The

Elmo Corp., The

Fairbanks, Morse & Co.

Falk Corp., The

General Dynamics Corp., Electro

Dynamic Div.

General Electric Co., Apparatus

Sales Div.

GENERAL MOTORS OVERSEAS

OPERATIONS

GRAYBAR ELECTRIC CO., INC.

Hillman Co., Inc., C. Kirk

Howell Elec. Motors Co.

Ideal Electric & Mfg. Co.

International General Elec. Co.

Lima Electric Motor Co., The

LINK-BELT CO.

Master Electric Co., The

MINE & SMELTER SUPPLY CO.

THE MARCY MILL DIV.

Motoreducers—see Falk Corp., The

Pacific—see Western Gear Corp.

Pacific Gear & Tool Works, Inc.

Philadelphia Gear Works, Inc.

Reliance Electric & Engineering Co.

Rite-Lo-Speed—see Christian Engi-

neers, J. D.

Sterling Electric Motors, Inc.

Syncogear—see U.S. Electrical Mo-

tors, Inc.

U.S. Electrical Motors, Inc.

Wagner Electric Corp.

Western Gear Corp., (Lynwood)

Western Gear Corp., (S. F.)

Westinghouse Air Brake Co., Cleve-

land Rock Drill Div.

Westinghouse Electric Corp.

WESTINGHOUSE ELECTRIC IN-

TERNATIONAL CO.

CO.

HYDRAULIC MOTORS

Berry—see Oliver Iron & Steel Corp.

Oliver Iron & Steel Corp.

See Plant Design and

Construction

MINE CARS

See Cars, Mine

MINE DOORS

See Doors, Mine

MINE SAFETY EQUIPMENT

See Safety Equipment

MONITORS (HYDRAULIC)

## Prospecting Equipment

Westinghouse Air Brake Co., Cleveland Rock Drill Div.  
Westinghouse Air Brake Co., Le Roi Div.  
Wright Power Saw & Tool Corp.

Koppers Co., Inc.  
Link-Belt Co.  
Loesche, Germany  
McDowell Co., Inc.  
Surface Combustion Corp.

Amercat Corp.  
American Hard Rubber Co.  
Carton Products Corp.  
Clearstream—see Yardley Plastics Co.

**GOULD & CO., GORDON I. HACK ENGINEERING CO.**  
**HEWITT-ROBINS INC.**  
Heyl & Patterson, Inc.  
Humboldt, Klöckner-Humboldt-Deutz, A. G.  
Kaiser Engineers  
Keegel, C. P.  
**KENNEDY-VAN SAUN MFG. ENG. CORP.**  
Klöckner-Humboldt-Deutz, A. G.  
Knapp & Bates, Ltd.  
Koppers Co., Inc.  
**LINK-BELT CO.**  
Linta, Mark  
Loesche, Germany  
**LOEWY-HYDROPRESS—SEE BALDWIN-LIMA-HAMILTON CORP.**

### OILS

See Lubricants; Reagents and Chemicals

### OPEN GEARING

See also Gears  
Falk Corp., The  
Farrel-Birmingham Co., Inc.  
Western Gear Corp.

### PIPE AND FITTINGS

See also Couplings

Aluminum Pipe  
Ames Co., W. R.

### ASBESTOS

Air Cel—see The Philip Carey Mfg. Co.  
Armclo Drainage & Metal Products, Inc.  
Johns-Manville Sales Corp.  
Perfecto—see The Philip Carey Mfg. Co.  
Philip Carey Mfg. Co., The  
Protecto—see The Philip Carey Mfg. Co.  
Superlight—see The Philip Carey Mfg. Co.  
Tempchek—see The Philip Carey Mfg. Co.  
Transite—see Johns-Manville

### CAST AND STEEL

**AMERICAN BRAKE SHOE CO., AMER. MANGANESE STEEL DIV.**  
American Locomotive Co.  
Armclo Drainage & Metal Products, Inc.  
**BETHLEHEM PACIFIC COAST STEEL CORP.**  
Bethlehem Steel Co.  
Bethlehem Steel Export Corp.  
CW—see National Supply Co.  
Calumet & Hecla, Inc., Calumet Div.  
Crane Co.  
**ELECTRIC STEEL FOUNDRY CO.**  
G—see Grinnell Co., Inc.  
Grinnell Co., Inc.  
**HADDFIELDS LTD.**  
Kaiser Steel Corp.  
Lead Lined Iron Pipe Co.  
Mannesmann Export G.m.b.H.  
McNally Pittsburgh Co.  
Michigan Pipe Co.  
Mills Iron Wks., Inc.  
**MINE & SMOELTER SUPPLY CO., THE MARCY MILL DIV.**  
National Iron Co.  
National Supply Co., The  
Pacific Pipe Co.  
Pacific Wood Tank Corp.  
Porter Co., Inc., H. K., W-S Fittings Div.  
Republic Steel Corp.  
Span—see National Supply Co., The

Taylor Forge & Pipe Works  
United States Steel Corp.  
United States Steel Corp., Columbia Geneva Div.  
**UNITED STATES STEEL EXPORT CO.**  
Vitaistic Co. of America  
Walworth Co.  
Western Foundry Co.  
Youngstown Sheet & Tube Co., The

### RUBBER LINED

American Hard Rubber Co.  
Goodall Rubber Co.  
Goodrich Co., B. F., Industrial Prod. Div.  
**INTERNATIONAL B. F. GOODRICH**  
Michigan Pipe Co.  
**NAYLOR PIPE CO.**  
Pacific Pipe Co.  
Quaker Pioneer Rubber Mills Raybestos-Manhattan, Inc.  
 **THERMOID CO.**  
U. S. Rubber Co.

### STEEL, SPIRAL-WELDED

Armclo Drainage & Metal Products, Inc.  
Armclo Steel Corp.  
Hydraulic Supply Mfg. Co.  
Lead Lined Iron Pipe Co.  
**NAYLOR PIPE CO.**  
Pacific Pipe Co.  
Taylor Forge & Pipe Wks.

### WOOD

**FEDERAL PIPE & TANK CO.**  
Michigan Pipe Co.  
**NATIONAL TANK & PIPE CO.**  
Pacific Pipe Co.  
Pacific Wood Tank Corp.  
**SANTA FE TANK DIV., FLOUR PRODUCTS CO.**  
Sutphen, Peter O.

### VALVES—see VALVES

### PLANT DESIGN AND CONSTRUCTION

Allen and Garcia Co.  
**BALDWIN-LIMA-HAMILTON CORP.**  
**BARBER-GREENE CO.**  
Baukol, Philip J.  
**BOOTH CO. INC., THE**  
Braun & Co., C. F., Alhambra, Calif.  
Carmo Mfg. Inc.  
**CHAPMAN AND WOOD**  
Continental Gin Co.  
**COWIN & CO., INC.**  
**DENVER EQUIPMENT CO.**  
Dorr-Oliver, Inc.  
**DRAVO CORP.**  
Drullard Co., Howard  
Fisher Contracting Co.  
Eimco Corp., The  
Foster Wheeler Corp.  
Frey Design—see Koppers Co., Inc.  
Galigher Co.

### PLASTIC

**Manufacturer's Complete Names and Addresses are listed in Section II, last pages of this yellow section. Firms appearing in boldface caps carry advertisements in this issue.**

### PELLETIZERS AND NODULIZERS

**DRAVO CORP.**  
**HARDINGE CO., INC.**  
Heyl & Patterson, Inc.  
International Engr., Inc.  
**KENNEDY-VAN SAUN MFG. & ENG. CORP.**

### PNEUMATIC CONCRETING PLACING

Air Placement Equip. Co.  
Bondactor—see Air Placement Equip. Co.  
**CEMENT GUN CO.**  
Construction Machinery Co.  
Drullard Co., Howard  
Elmo Corp., The  
Ground-Or-Blaster—see Air Placement Equipment Co.  
**GUNITE—SEE CEMENT GUN CO.**  
**MAYO TUNNEL & MINE EQUIPMENT**  
Mix-elevator—see Air Placement Equip. Co.  
Nucrator—see Air Placement Equip. Co.

### PNEUMATIC TOOLS

See Tools, Air Driven

### POSTS

See Arms and Posts

### POWDER

See Blasting Supplies

### PRESERVATIVES

See Reagents and Chemicals

### PROSPECTING EQUIPMENT

See Exploration Equipment

## Pulleys

### PULLEYS

**See also Magnetic Equipment**

**AMERICAN BRAKE SHOE CO.,  
AMER. MANGANESE STEEL  
DIV.**

**AMSCO—SEE AMERICAN BRAKE  
SHOE CO.**

Bodinson Mfg. Co.

Bonded Scale & Machine Co.

Chain Belt Co.

Continental Gin Co.

Conveyor Co., The

Dings Magnetic Separator Co.

Dodge Mfg. Co.

Eberhard Bauer, G.m.b.H.

**HEWITT-ROBINS, INC.**

Humboldt, Klockner - Humboldt-

Deutz, A. G.

Internaldrane—see Yuba Mfg. Co.

Jeffrey Manufacturing Co.

**LINK-BELT CO.**

Lippmann Engineering Works

Magnetic Eng. & Mfg. Co.

Ogden Iron Works Co.

Reeves Pulley Co.

Rex—see Chain Belt Co.

Sanford-Day-Iron Works Inc.

Spookum Co., Inc., The

**STEPHENS-ADAMSON MFG. CO.**

**TELLURIDE IRON WORKS CO.**

Van Corp Manufacturing Company,

Inc.

Wedg-Gripp—see Christian Engi-

neers, J.D.

Western Foundry Co.

Western Gear Works

Worthington Corp.

Yuba Manufacturing Co.

**PULVERIZERS**

**See Crushers, Grinding Equip-**

**ment, Laboratory Supplies**

Loesche Hartszerkleinerungs und

Zement-maschinen ("Loesche  
Mills")

### PUMPS

#### ACID

**ALLEN-SHERMAN-HOFF PUMP  
CO., THE**

**ALLIS-CHALMERS MFG. CO.,  
INDUSTRIES GROUP**

**AMERICAN BRAKE SHOE CO.,  
AMER. MANGANESE STEEL  
DIV.**

Amag-Hilpert-Pegnitzhuette A. G.

American Hard Rubber Co.

AMPCO Metal, Inc.

Amico Centrifugal Pumps — see

Ampco Metal, Inc.

**AMSCO—SEE AMERICAN BRAKE  
SHOE CO.**

Apco—see New York Air Brake Co.

The, Aurora Pump Div.

Aurora—see New York Air Brake

Co., The, Aurora Pump Div.

**BARRETT, HAENTJENS & CO.**

Buck & Associates, Carl

Byron Jackson Pumps, Inc.

Camac—see Carl Buck & Associates

**CENTRISEAL—SEE THE ALLEN-**

**SHERMAN-HOFF PUMP CO.**

Dean Bros. Pumps, Inc.

Deming Co.

**DENVER EQUIPMENT CO.**

**DENVER FIRE CLAY CO.**

Dorr-Oliver, Inc.

Duriron Co., Inc., The

**ELECTRIC STEEL FOUNDRY CO.**

Fairbanks, Morse & Co.

Food Machinery & Chemical Corp.

Peerless Pump Div.

Galigher Co., The

Galigher Sump Pump—see Galigher

Co., The

**GARDNER-DENVER CO.**

**HAZELTON—SEE BARRETT,**

**HAENTJENS & CO.**

**HYDROSEAL—SEE THE ALLEN-**

**SHERMAN-HOFF PUMP CO.**

**INGERSOLL-RAND CO.**

International Combustion, Ltd.

Jacuzzi Bros., Inc.

Jaeger Machine Co., The

Krogh Pump & Equipment Co.

LaBour Co.

Mannesmann Export G.m.b.H.

Marlow Pumps—Div. of Bell & Gossett Co.

Mather & Platt Ltd.

Moyno—see Robbins & Myers, Inc.

**NAGLE PUMPS, INC.**

New York Air Brake Co., The

Aurora Pump Div.

**OLIVITE—SEE DORR-OLIVER,  
INC.**

Robbins & Myers, Inc.

Vacseal—see Galigher Co., The

Vacseal—see International Com-

bustion Ltd.

**WESTERN MACH. CO.**

**WILFLEY & SONS, INC., A. R.**

Worthington Corp.

#### AIR DRIVEN

**ATLAS CONCO AB, SWEDEN**

**BARRETT, HAENTJENS & CO.**

Byron Jackson Pumps, Inc.

**CHICAGO PNEUMATIC TOOL  
CO.**

Consolidated Pneumatic Tool Co.,

Ltd.

**HAZELTON—SEE BARRETT,**

**HAENTJENS & CO.**

**INGERSOLL-RAND CO.**

Krogh Pump Co. LaBour Co., Inc.

The

**LEDEEN MFG. CO.**

Mannesmann Export G.m.b.H.

Marlow Pumps, Div. of Bell & Gossett Co.

Porter Co., Inc., H. K., W-S Fit-

tings Div.

Schramm, Inc.

Stewart-Warner Corp.

Thor Power Tool Co.

Westinghouse Air Brake Co., Le

Roi Div.

#### FILTRATE

**BARRETT, HAENTJENS & CO.**

#### LINERS

Ruhrkunststoff G.m.b.H.

#### MINE AND DEEP WELL

**ALLIS-CHALMERS MFG. CO.,  
INDUSTRIES GROUP**

Amag-Hilpert-Pegnitzhuette A. G.

**AMERICAN BRAKE SHOE CO.,  
AMER. MANGANESE STEEL  
DIV.**

**AMSCO—SEE AMERICAN BRAKE  
SHOE CO.**

Aurora—see New York Air Brake

Co., The, Aurora Pump Div.

**BARRETT, HAENTJENS & CO.**

Brown—see Sanford Day Iron

Works, Inc.

Byron Jackson Pumps, Inc.

**CHICAGO PNEUMATIC TOOL CO.**

Deming, Co., The

Forbush Morse Co.

**FLYGT—STANCO MFG. CO.  
SALES, INC.**

**GARDNER-DENVER CO.**

**HAZELTON & PLEUGER—SEE  
BARRETT, HAENTJENS & CO.**

**INGERSOLL-RAND CO.**

Jacuzzi Bros., Inc.

Jaeger Machine Co., The

Johnston Pump Co.

Krogh Pump & Equipment Co.

LaBour Co., Inc., The

Mannesmann Export G.m.b.H.

Marlow Pumps Div., Bell & Gossett Co.

Mather & Platt Ltd.

Moyno—see Robbins & Myers, Inc.

National Supply Co. (Pa.)

New York Air Brake Co., The

Aurora Pump Div.

Peerless Pump Div.

Plueger, Unterwasserpumpen

Pumps, Inc.

Rice Pump & Mach. Co.

Robbins & Myers, Inc.

Salzgitter Maschinen Aktiengesell-

schaft

Sanford Day Iron Works

**STANCO MFG. & SALES, INC.**

Standard Elec. Mfg. Co., Inc.

**STENBERG CORPORATION A/B**

Turbo-Maschinen A.G.

Wedge A.G.

Worthington Corp.

#### SAND AND SLIME

**ALLEN-SHERMAN-HOFF PUMP  
CO., THE**

**ALLIS-CHALMERS MFG. CO.,  
INDUSTRIES GROUP**

Amag-Hilpert-Pegnitzhuette A. G.

**AMERICAN BRAKE SHOE CO.,  
AMER. MANGANESE STEEL  
DIV.**

**AMSCO—SEE AMERICAN BRAKE  
SHOE CO.**

**BARRETT, HAENTJENS & CO.**

Bodinson Mfg. Co.

**CARPCO MFG. INC.**

**CENTRISEAL—SEE THE ALLEN-**

**SHERMAN-HOFF PUMP CO.**

**CHICAGO PNEUMATIC TOOL CO.**

Consolidated Pneumatic Tool Co.,

Ltd.

**DENVER EQUIPMENT CO.**

**DORR-OLIVER, INC.**

Erie—see Erie Pump & Engine

Works

Erie Pump & Engine Works

Erie Pump & Engine Works

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Erie Pump &amp

## Reagents and Chemicals

### FLOCCULENTS

Acrysol CA—see Rohm & Haas Co.  
Acrysol CQ—see Rohm & Haas Co.  
Allied Chemical & Dye Corp., General Chem. Div.  
Cesalpinia s.p.a.  
**CROWN ZELLERBACH CORP.**  
Flocal—see Cesalpinia s.p.a.  
General Mills, Inc.

### FLOTATION REAGENTS

Alamacs, Alamines—see General Mills Inc., Chem. Div.  
Allied Chemical & Dye Corp., Barrett Div., American Agricultural Chem. Corp.  
**AMERICAN CYANAMID COMPANY MINERAL DRESSING DEPT.**  
Armacs—see Armour Chemical Division  
Armour Chemical Division  
**ATLAS POWDER CO.**  
Braun-Knecht-Heimann Co.  
**CROWN ZELLERBACH CORP.**  
Denver Fire Clay Co.  
Dow Chemical Co., The  
Du Pont de Nemours & Co., Inc., Chemical Div.  
Farbwerke Hoechst A.G.  
General Mills, Inc., Chemical Div.  
Hercules Powder Co.  
Koppers Co., Inc.  
Matheson Co., Inc., The  
Metsco—see Philadelphia Quartz Co.  
Mona Industries, Inc.  
Monamid, Monamine, Monapon, Monaterre, Monawet—see Mona Industries, Inc.  
Monsanto Chem. Co.  
Newport Industries Co.  
**ORZANA—SEE CROWN ZELLERBACH CORP.**  
PQ—see Philadelphia Quartz Co.  
Pennsalt Chemicals Corp.  
Pentasol—see Sharples Chemicals Inc.  
Petrolote—see Sonneborn Sons, Inc., L.  
Philadelphia Quartz Co.  
Prineline 81-R—see Rohm & Haas Co.  
Prineline JM-T—see Rohm & Haas Co.  
Reilly Tar & Chemical Corp.  
Rohm & Haas Co.  
Sharples Chemicals Inc.  
Sonneborn Sons, Inc., L.  
Swift & Co., Technical Prod. Plant  
**UNITED STATES STEEL CORP.**  
Van Waters & Rogers, Inc.  
Westvaco-Chlor-Alkali Div., Food Mach. & Chem. Corp.

Amine Liquid Extracts—see Rohm & Haas Co.

Apache Powder Co.  
Armour Chemical Division  
Atlas Powder Co.  
Braun Corp.  
Braun-Knecht-Heimann Co.  
Central Scientific Co. of Calif.  
**CROWN ZELLERBACH CORP.**  
**DENVER FIRE CLAY CO.**  
Dow Chemical Co., The  
du Pont de Nemours & Co., E. I., Chemicals Dept.  
Food Machinery & Chemical Corp., Westvaco Chemical Div.  
General Mills, Inc., Chemical Div.  
Guarco—see General Mills, Inc.  
Hercules Powder Co.  
**JOHNSON MARCH CORP.**  
Lerlab Supply Co.  
Matheson Co., Inc.  
Menlo Research Lab.  
Merck & Co.  
Minerec Corp.  
Mona Industries, Inc.  
Monsanto Chemical Co.  
Nucleonic Corp. of America  
Orzana—see Crown Zellerbach Corp.

Pennsalt Chemicals Corp.  
Phelps Dodge Refining Corp.  
Philadelphia Quartz Co.  
Reilly Tar & Chem. Corp.  
Rohm & Haas Co.  
Sharples Chemicals Inc.  
Swift & Co., Technical Prod. Plant  
Union Carbide and Carbon Corp.  
**UNITED STATES STEEL CORP.**  
Van Waters & Rogers, Inc.  
West Chester Chem. Co.  
Westvaco-Chlor-Alkali Div., Food Mach. & Chem. Corp.

### RECORDERS

See Testing, Recording & Control Equip.

### REDUCERS, SPEED

See Speed Changers

### REFRACTORIES

Air Placement Equip. Co.  
Alfrax—see Carborundum Co., The  
Alundum—see Norton Co.  
**AMERICAN BRAKE SHOE CO.**  
Aztek—see Mexico Refractories Co.  
**BABCOCK & WILCOX CO., THE**  
Blazcrete—see Johns-Manville  
Carbofrax—see Carborundum Co., The  
Carborundum Co., The, Refractories Div.  
Crystolon—see Norton Co.  
**DFC—SEE DENVER FIRE CLAY CO., THE**  
**DENVER FIRE CLAY CO., THE**  
**FIRECRETE—SEE JOHNS-MANVILLE**  
General Refractories Co.  
Harbison-Walker Refractories Co.  
Jay Bee—see Mexico Refractories Co.  
Johns-Manville Sales Corp.  
Kaiser Aluminum & Chem. Corp.  
Mexico Refractories Co.  
Monofrax—see Carborundum Co., The  
Mullfrax—see Carborundum Co., The  
Narm—see North Am. Refractories Co.  
North American Refractories Co.  
Refrax—see Carborundum Co., The  
Robinson Clay Product Co., The  
Utah Fire Clay Co.

### RESPIRATORS

See Safety Equipment

### ROASTING

### FURNACES

See Dryers and Kilns; Pyrometallurgical Equipment; Sintering Machines

### ROCK BOLTS

See Bolts, Rock

### ROD MILLS

See Grinding Equipment

### RODS

See Grinding Equipment; Welding Equipment

### ROLLS, ROLLERS

See Crushers; Conveyors

### ROOF BOLTS

See Bolts, Rock

### ROPE, WIRE, AND

### ACCESSORIES

American Chain & Cable Company, Inc.  
American Chain & Cable Co., Inc., Hazard Wire Rope Div.  
American Chain & Cable Co., Inc., Wire Rope Div.  
American Hoist & Derrick Co., Crosby-Laughlin Div.  
Band-it Co.  
**BETHLEHEM PACIFIC COAST STEEL CORP.**  
Bethlehem Steel Co.  
Bethlehem Steel Export Corp.  
Blackburn International Corp.  
Bodinson Mfg. Co.  
British Ropes Ltd.  
Broderick & Bascom Rope Co.  
Bullard Co., E. D.  
Bullard-Burnham—see Bullard Co., E. D.  
Canada Wire & Cable Co., Ltd.  
P. S. "R"  
Canton Mfg. Co.  
Carco—see Pacific Car & Foundry Co.  
**COLEMAN CABLE & WIRE CO.**  
**COLORADO FUEL & IRON CORP.**  
Crosby—see American Hoist & Derrick Co.  
Crucible Steel Co. of America  
Edwards Co., F. H.  
**ELECTRIC STEEL FOUNDRY CO.**  
Fulbright, G. F.  
**GRAYBAR ELECTRIC CO., INC.**  
Goodrich Co., The B. F.  
**GRIPOIST, INC.**  
Iron Grip—see Princeton Griphoist Co.  
Jones & Laughlin Steel Corp.  
Laughlin, The Thomas  
Laughlin-Crosby—see American Hoist & Derrick Co.  
**LE TOURNEAU-WESTINGHOUSE CO.**  
Leschen Wire Rope—see H. K. Porter Co., Inc.  
MacWhye Co.  
Mill & Mine Supply, Inc.  
Mosebach Electric & Supply Co.  
**OKONITE CO., THE**  
Pacific Car & Foundry Co.  
Pacific Wire Rope Co.  
H. K. Porter Co., Inc., Leschen  
Wire Rope Div.  
Princeton Griphoist Inc.  
Punch-Lok Co.  
**RIBLET BLACKBURN INT'L CORP.**  
**ROEBLING'S SONS CORP., JOHN A.**  
Round Chain Cos.  
Ryerson & Son, Inc., Joseph T.  
**SAUERMAN BROS., INC.**  
Synflex—see Wall Rope Wks., Inc.  
**TELLURIDE IRON WKS.**  
**TIGER BRAND—SEE U. S. STEEL EXP. CO.**  
**TOURNAPROPE—SEE LE TOURNEAU-WESTINGHOUSE CO.**  
Union Wire Rope Corp.  
**U. S. STEEL CORP.**  
U. S. Tiger Brand—see United States Steel Corp., Co., Columbian-Geneva Steel Div.  
**U. S. STEEL CORP., TENNESSEE COAL & IRON DIV.**  
**UNITED STATES STEEL CORP., COLUMBIA-GENEVA DIV.**  
**UNITED STATES STEEL EXPORT CO.**  
Wall Rope Wks., Inc.  
Wireco—see Wire Rope Co. of Am. Inc.

Wire Rope Corp., of America, Inc.

**WICKWIRE—SEE COLORADO FUEL & IRON CORP., THE**

### RUBBER PRODUCTS

See Belts; Hose; Conveyor Equipment; Safety Equipment

### SAFETY EQUIPMENT

#### APPAREL

American Optical Co.  
Bausch & Lomb Optical Co.  
Bullard Co., E. D.  
Gardwell—see Safety Clothing & Equipment Co.  
Goodall Rubber Co.  
Industrial Air Prods. Co.  
**INTERNATIONAL B. F. GOODRICH**  
Johns-Manville Sales Corp.  
Lehigh Safety Shoe Co.  
**MARTINDALE ELECTRIC CO.**  
**MINE SAFETY APPLIANCES CO.**  
Parker Safety Equipment Co.  
Pulmosan Safety Equip. Corp.  
Sat I—see U. S. Safety Service Co.  
Safety Clothing & Equipment Co.  
Safety First Supply Co.  
**SKULLGARD—SEE MINE SAFETY APPLIANCES CO.**  
Sly Mfg. Co., W. W.  
United States Rubber Co.  
U. S. Safety Service Co.  
Wil-Gard—see Wilson Rubber Co., The  
Wilson Rubber Co., The

#### FIREFIGHTING EQUIPMENT

American-LaFrance Corp.  
American Rubber Mfg. Co.  
Badger Fire Extinguisher Co.  
Blackhawk Mfg. Co.  
Bullard Co., E. D.  
Four Wheel Drive Auto Co., The General Detroit Corp.,  
General Fire Extinguisher Corp., The  
Goodrich Co., The B. F.  
Grinnell Co., Inc.  
Industrial Air Prods. Co.  
**INTERNATIONAL B. F. GOODRICH**  
Kidde & Co. Inc., Walter Lee Rubber & Tire Corp., Republic Rubber Div.  
**MINE SAFETY APPLIANCES CO.**  
Pulmosan Safety Equipment Corp.  
Pyrene-C-O Two  
Republic Rubber Div., Lee Rubber & Tire Corp.  
Safety Clothing & Equipment Co.  
Safety Fire Extinguisher Co.  
Safety First Supply Co.  
U. S. Safety Service Co.

#### GENERAL

American Optical Co.  
Ampco Metal, Inc.  
Atomic Engineering Corp.  
Bullard Co., E. D.  
Chicago Eye Shield Co.  
Gardwell—see Safety Clothing & Equipment Co.  
Linde Air Products Co.  
Lunkenheimer Co., The  
**MINE SAFETY APPLIANCES CO.**  
National First Aid Supply Co.  
Ohio Brass Co.  
Pulmosan Safety Equipment Corp.  
Ray-O-Vac Co.  
Rose Mfg. Co.  
Safe-Hi—see Rose Mfg. Co.  
Safety Clothing & Equipment Co.  
Safety First Supply Co.  
Wilson Products Div., Ray-O-Vac Co.

#### LIGHTS

A & A Mfg. Co.  
**EDISON—SEE MINE SAFETY APPLIANCES CO.**  
Electric Storage Battery Co., The Exide Ind. Div.  
General Electric Co., Lamp Div.  
**GRAYBAR ELECTRIC CO., INC.**  
Homelite Corp.  
Justrite Mfg. Co.  
**MARTINDALE ELECTRIC CO.**  
**MINE SAFETY APPLIANCES CO.**  
Mosebach Electric & Supply Co.  
National Mine Service Co.  
Ray-O-Vac Co.  
Revere Electric Mfg. Co.  
Safety First Supply Co.  
United States Electric Mfg. Corp.  
U. S. Safety Service Co.  
Westinghouse Electric Corp., Cleveland Div.

## Samplers

Wheat—see National Mine Service Co.  
Wolf Safety Lamp Co. of America, Inc.

### RESPIRATORS

America Optical Co.  
Bullard Co., E.D.  
Chicago Eye Shield Co.  
**COMFO—SEE MINE SAFETY APPLIANCES CO.**  
**DUSTFOR—SEE MINE SAFETY APPLIANCES CO.**  
Industrial Air Prod. Co.  
Linde Air Prod. Co.  
**MARTINDALE ELECTRIC CO.**  
**MINE SAFETY APPLIANCES CO.**  
Pulmosan Safety Equip. Corp.  
Ray-O-Vac Co.  
Safety Clothing & Equipment Co.  
Safety First Supply Co.  
Super-Tough—see Wilson Prod. Inc.  
U. S. Safety Service Co.  
Wilson Prod. Div., Ray-O-Vac Co.

### SELF CONTAINED OXYGEN

Bullard Co., E.D.  
**CHEMOX—SEE MINE SAFETY APPLIANCES CO.**  
Industrial Air Products Co.  
Linde Air Prod. Co.  
**MINE SAFETY APPLIANCES CO.**  
Safety First Supply Co.  
U. S. Safety Service Co.

## SAMPLERS

Agence Miniere Et Maritime, S. A.  
Carpo Mfg. Inc.  
Carrier Conveyor Corp.  
**COLORADO IRON WKS. CO.**  
**DENVER EQUIPMENT CO.**  
**DENVER FIRE CLAY CO.**  
Dickinson Laboratories, Inc.  
Ducon Co.  
Galigher Co., The  
Galigher Junior—see Galigher Co., The  
Gary-Jennings—see Galigher Co., The  
**HARDINGE CO., INC.**  
Heyl & Patterson, Inc.  
**INFILCO, INC.**  
International Combustion Ltd.  
**JONES—SEE DENVER FIRE CLAY CO., THE**  
Klockner-Humboldt-Deutz, A. G.  
Knapp & Bates Ltd.  
**LEDOUX & CO.**  
**LONGYEAR CO. R. J.**  
McNally Pittsburgh Co.  
**MINE & SMELTER SUPPLY CO.**  
**MINE SAFETY APPLIANCES CO.**  
Minerals et Metux  
Mobile Drilling Inc.  
Penn-drill—see Pennsylvania Drill  
Pennsylvania Drilling Co.  
Sepo Microsplitter Supply  
Smith-Emergy Co.  
Stapler Co., The  
**STURTEVANT MILL CO.**  
**TELLURIDE IRON WORKS CO.**  
**TRAYLOR ENGR. & MFG. CO.**  
**VEZIN—SEE COLORADO IRON WORKS CO.**

## SAWS, POWER

See also Tools, Air Driven

### CHAIN SAWS

Andreas Stihl Maschinenfabrik  
Consolidated Pneumatic Tool Co., Ltd.  
Dolmar Maschinen Fabrik  
**GRAYBAR ELECTRIC CO., INC.**  
Homelite Div., Textron, Inc.  
Mill & Mine Supply, Inc.  
**PORTO-CUT—SEE VULCAN IRON WORKS, DENVER, COLO.**  
Titan—see Mill & Mine Supply, Inc.  
**VULCAN IRON WORKS (DENVER)**  
Wright Power Saw and Tool Corp.

### FRAMING SAWS

**DENVER EQUIPMENT CO.**  
**STEARNS ROGER MFG. CO.**

### POWERED HAND SAWS

Andreas Stihl Maschinenfabrik  
**ATLAS CONCO AB, SWEDEN**  
**CHICAGO PNEUMATIC TOOL CO.**  
Consolidated Pneumatic Tool Co., Ltd.  
**GRAYBAR ELECTRIC CO., INC.**  
INGERSOLL-RAND CO.  
**SYNTRON CO.**  
Thor Power Tool Co.  
**VULCAN-DENVER-VULCAN IRON WORKS**  
Wright Power Saw & Tool Corp.

## SCALES

### AUTOMATIC WEIGHING AND

#### BELT SCALES

ABCs Scale Division, McDowell Co., Inc.  
**BALDWIN-LIMA-HAMILTON CORP.**  
Bodinson Mfg. Co.  
Con-O-Weigh, see Industrial Physics & Electronics Co.  
Conveyor Co., The  
Fairbanks, Morse & Co.  
Hove Scale Co., The  
Industrial Physics & Electronics Co.  
Koebring Co., Johnson Co., C. S.  
McDowell Co., Inc. The  
**MERRICK SCALE MFG. CO.**  
**POIDOMETER—SEE SCHAFER POIDOMETER CO.**  
Richardson Scale Co.  
**SCHAFFER POIDOMETER CO.**  
St. Regis Paper Co.  
Toledo Scale Co.  
Transportometer—see McDowell Co., Inc. The  
**WEIGHTMETER—SEE MERRICK SCALE MFG. CO.**

#### TRUCK AND RAILROAD SCALES

Fairbanks, Morse & Co.  
Hove Scale Co., The  
Industrial Physics & Electronics Co.  
Richardson Scale Co.  
Toledo Scale Co.

## SCRAPERS

See also Excavators; Tractors and Attachments

**ALLIS-CHALMERS MFG. CO.**  
CONST. MACHY. DIV.  
**ALLIS-CHALMERS MFG. CO.**  
INDUSTRIES GROUP  
**AMERICAN BRAKE SHOE CO.**  
ALLOY STEEL & METALS CO.  
AMERICAN BRAKE SHOE CO., AMER. MANGANESE STEEL DIV.

American Tractor Equipment Corp.  
**AMSCO—SEE AMERICAN BRAKE SHOE CO.**

**BALDWIN-LIMA-HAMILTON CORP.**

Caterpillar Tractor Co.  
**CLARK EQUIPMENT CO., CONST. MACHY. DIV.**

**COLUMBIA STEEL CASTING CO. INC.**

**CRESCENT — SEE SAUER-MAAN BROS. INC.**

**DEMAK AKTIENGESELLSCHAFT**

Emco Corp., The

**ELECTRIC STEEL FOUNDRY CO.**

**EUCID DIV., GENERAL MOTORS CORP.**

**GENERAL MOTORS CORP. EUCLID DIV.**

**GENERAL MOTORS OVERSEAS OPERATIONS**

International Combustion Ltd.

**INTERNATIONAL HARVESTER CO.**

**JOY MANUFACTURING CO.**

Landia Steel Co.

**LE TOURNEAU-WESTINGHOUSE CO.**

Ogden Iron Works Co.

**PACIFIC—SEE ALLOY STEEL & METALS CO.**

Salzgitter Maschinen Aktiengesellschaft

Pacific Car & Foundry Co.

**SAUERMAN BROS. INC.**

Terra Clipper—see Wooldridge Mfg. Co.

Thompson-Berg Company

**VICKERS-ARMSTRONGS (TRACTORS) LTD.**

**VULCAN DENVER—SEE VULCAN IRON WORKS, DENVER, COLO.**

**VULCAN IRON WORKS (DENVER)**

Westinghouse Air Brake Co., Pa.

**WESTINGHOUSE CO., LE TOURNEAU**

Woodbridge Mfg. Div., Continental Copper & Steel Industries, Inc.

**PRODUCTIVE EQUIPMENT CORP.**

**RIPE FLO—SEE ALLIS-CHALMERS MFG. CO.**

**ROSS SCREEN & FEEDER CO.**

Screen Equipment Co., Inc.

**Seco—see Screen Equipment Co., Inc.**

**SELECTRO—SEE PRODUCTIVE EQUIPMENT CORP.**

Siebtechnik G.m.b.H.

Simplicity Engineering Co.

Smith Engineering Works

**SOUTHWESTERN ENGR. CO.**

Cleveland Wire Cloth & Mfg. Co.

**STA KLEEN—SEE ALLIS CHALMERS MFG. CO.**

The

**SCREENS, GRIZZLIES, AND ACCESSORIES**

#### REVOLVING SCREENS

**ALLIS-CHALMERS MFG. CO., INDUSTRIES GROUP**

**AMERICAN BRAKE SHOE CO., AMER. MANGANESE STEEL DIV.**

Bodinson Mfg. Co.

**SYNTRON CO.**

Thor Power Tool Co.

**VULCAN-DENVER-VULCAN IRON WORKS**

Wright Power Saw & Tool Corp.

Conveyor Co., The  
**DENVER EQUIPMENT CO.**  
Dunham Mfg. & Sales Co., Gordon S.

**HACK ENG. CO.**

Hendrick, Mfg. Co.

Iowa Mfg. Co.

**KENNEDY-VAN SAUN MFG. & ENG. CORP.**

Klockner-Humboldt-Deutz, A. G.

Krupp, Fried. Maschinen und Stahlbau Rheinhausen

**LINK-BELT CO.**

Lippmann Engineering Wks., Inc.

**MCALAHAN & STONE CORP.**

**NORDBERG MFG. CO.**

Pioneer Eng. Div., Poor & Co., Inc.

Rogers Iron Works Co.

Smith Engineering Works

**STEARNS-ROGER MFG. CO.**

**STEPHENSON-ADAMSON MFG. CO.**

**SYMONS—SEE NORDBERG MFG. CO.**

Symons Bros. Co.

**SYNTRON CO.**

Taylor-Wharton Iron & Steel Co.

**THERMO-DECK—SEE ALLIS-CHALMERS MFG. CO.**

**TY-ROCK—SEE TYLER CO., THE W. S.**

**TY-ROCKET—SEE TYLER CO., THE W. S.**

**TYLER CO., THE W. S.**

**TYLER-NIAGARA—SEE TYLER CO., THE W. S.**

Universal Dredge Mfg. Co.

Universal Engineering Corp.

Universal Vibrating Screen Co.

Wedge Wire Corp.

Williams Crusher & Pulverizer Co.

Wilmett Engineering Co.

Wolf, Buckau R. (Maschinenfabrik A. G.)

Yuba Manufacturing Co.

**STEARNS-ROGER MFG. CO.**

**STEPHENSON-ADAMSON MFG. CO.**

Straub Mfg. Co., Inc.

**STURTEVANT MILL CO.**

**SYMONS—SEE NORDBERG MFG. CO.**

Syntron Bros. Co.

**SYNTRON CO.**

Taylor-Wharton Iron & Steel Co.

**THERMO-DECK—SEE ALLIS-CHALMERS MFG. CO.**

**TY-ROCK—SEE TYLER CO., THE W. S.**

**TY-ROCKET—SEE TYLER CO., THE W. S.**

**TYLER CO., THE W. S.**

**TYLER-NIAGARA—SEE TYLER CO., THE W. S.**

Universal Dredge Mfg. Co.

Universal Engineering Corp.

Universal Vibrating Screen Co.

Wedge Wire Corp.

Williams Crusher & Pulverizer Co.

Wilmett Engineering Co.

Wolf, Buckau R. (Maschinenfabrik A. G.)

Yuba Manufacturing Co.

## STATIONARY SCREENS AND GRIZZLIES

**ALLISON STEEL MFG. CO.**  
**AMERICAN BRAKE SHOE CO., AMERICAN MANGANESE STEEL DIV.**

**AMSCO—SEE AMERICAN BRAKE SHOE CO.**

Bixby-Zimmer Engineering Co.

Bodinson Mfg. Co.

**CAL-WIC—SEE COLORADO FUEL & IRON CORP., THE**

**CARDIRON WKS., CO.**

**COLORADO FUEL & IRON CORP., THE**

**COLUMBIA STEEL CASTING CO. INC.**

Conveyor Co., The

Diamond Iron Works Div., Goodman Mfg. Co.

**DORR-OLIVER, INC.**

Fraser & Chalmers Eng. Wks.

Gruendler Crusher & Pulverizer Co.

**HACK ENG. CO.**

Hendrick, Mfg. Co.

**HEWITT-ROBINS, INC.**

Iowa Mfg. Co.

**KENNEDY-VAN SAUN MFG. & ENG. CORP.**

Klockner-Humboldt-Deutz, A. G.

Krupp, Fried. Maschinen und Stahlbau Rheinhausen

**LINK-BELT CO.**

Lippmann Engineering Works

**MALLIX—SEE NATIONAL MALLEABLE & STEEL CASTINGS CO.**

**MCALAHAN & STONE CORP.**

**NATIONAL IRON CO.**

**NATIONAL MALLEABLE & STEEL CASTINGS CO.**

Nolan Co., The

Os-A-Veyer—see Simplicity Eng. Co.

Pioneer Eng. Div., Poor & Co., Inc.

**ROSS SCREEN & FEEDER CO.**

Simplicity Eng. Co.

Smith Engineering Works

**STEARNS-ROGER MFG. CO.**

Straub Mfg. Co., Inc.

**STEPHENSON-ADAMSON MFG. CO.**

Star Wire Screen & Iron Wks., Inc.

**SYNTRON CO.**

Taylor-Wharton Iron & Steel Co.

Telluride Iron Wks.

**TRAYLOR ENGINEERING & MFG. CO.**

**TYLER CO., THE W. S.**

Universal Dredge Mfg. Co.

Universal Engineering Corp.

Washington Machinery Co.

Wedge Wire Corp.

Yuba Mfg. Co.

## TROMMELS

**ALLIS-CHALMERS MFG. CO., INDUSTRIES GROUP**

**AMERICAN BRAKE SHOE CO., AMER. MANGANESE STEEL DIV.**

**AMSCO—SEE AMERICAN BRAKE SHOE CO.**

Bodinson Mfg. Co.

**CAL-WIC—SEE COLORADO FUEL & IRON CORP., THE**

**CARDIRON WKS., CO.**

Cleveland Wire Cloth & Mfg. Co.

**COLORADO FUEL & IRON CORP., THE**

**COLUMBIA STEEL CASTING CO. INC.**

Conveyor Co., The

Gruendler Crusher & Pulverizer Co.

Gundlach Machine Co., T. J.

Hendrick, Mfg. Co.

Iowa Mfg. Co.

## Slushers

KENNEDY-VAN SAUN MFG. & ENG. CORP.  
LINK-BELT CO.  
Lippmann Engineering Works  
Mackin Equip Co.  
McLanahan & Stone Corp.  
MINERS FOUNDRY & MFG. CO.  
NORDBERG MFG. CO.  
Pioneer Engineering Div., Poor & Co., Inc.  
Rogers Iron Works Co.  
Smith Engineering Works  
STEARNS ROGER MFG. CO.  
STEPHENS-ADAMSON MFG. CO.  
Straub Mfg. Co., Inc.  
SYMONS—SEE NORDBERG MFG. CO.  
Taylor-Wharton Iron & Steel Co.  
TELLURIDE IRON WKS.  
TRAYLOR ENGR. & MFG. CO.  
Universal Engineering Corp.  
Washington Iron Wks.  
Wedge Wire Corp.  
Yuba Manufacturing Co.

### VERTICAL SCREENS

LINK-BELT CO.  
NORDBERG MFG. CO.  
SYMONS—SEE NORDBERG MFG. CO.

### VIBRATING GRIZZLIES

ALLIS-CHALMERS MFG. CO., INDUSTRIES GROUP  
AMERICAN BRAKE SHOE CO., AMER. MANGANESE STEEL DIV.  
AMSCO—SEE AMERICAN BRAKE SHOE CO.

Bixby-Zimmer Engineering Co.  
CAL-WIC—SEE COLORADO FUEL & IRON CORP.—THE  
Chain Belt Co.  
Cleveland Wire Cloth & Mfg. Co.  
COLORADO FUEL & IRON CORP.—THE

Conveyor Co., The  
Fraser & Chalmers Eng. Wks.  
Gyratoy—see Korb Pettit Wire Fabrics

HACK ENGINEERING CO.  
Haver & Boecker  
Hein Lehmann & Co.  
Hendrick Mfg. Co.  
HEWITT-ROBINS, INC.

Hewitt-Robins, Inc., Korb-Pettit Wire Fabric & Iron Works, Inc., a subsid.

Iowa Mfg. Co.  
Klockner-Humboldt-Deutz, A. G.  
Korb Pettit Wire Fabrics & Iron Wks., Inc.

LINK-BELT CO.  
Lippmann Engineering Works  
Ludlow-Saylor Wire Cloth Co.

MALLIX—SEE NATIONAL MALLEABLE & STEEL CASTINGS CO.

NATIONAL MALLEABLE & STEEL CASTINGS CO.  
NORDBERG MFG. CO.

Ogden Iron Works Co.  
Overstrom & Sons

Pioneer Eng. Div., Poor & Co., Inc.  
PRODUCTIVE EQUIP. CORP.

ROSS SCREEN & FEEDER CO.

Simplicity Engineering Co.  
Smith Engineering Works

STARSTEEL—see Star Wire Screen & Iron Works, Inc.

Star Wire Screen & Iron Works, Inc.  
Sta-Clear—see Ludlow-Saylor Wire Cloth Co.

Sta-Smooth—see Ludlow-Saylor Wire Cloth Co.

Sta-Tru—see Ludlow Saylor Wire Cloth Co.

STEARNS-ROGER MFG. CO.

Super Gyratoy-Korb Pettit Wire Fabrics & Iron Works, Inc.

Super-LOY—see Ludlow-Saylor Wire Cloth Co.

SYMONS—SEE NORDBERG MFG. CO.

Taylor-Wharton Iron & Steel Co.  
TY-LOC—SEE TYLER CO., THE W. S.

TYLER CO., THE W. S.  
Universal Dredge Mfg. Co.  
Universal Engineering Corp.

Wedge Slot—see Hendrick Mfg. Co.

Wedge Wire Corp.

Westfälische Maschinenfabrik G.m.b.H.

### SPRAY NOZZLES

Carbofrax—see Carborundum Co., The, Refractories Div.

Carborundum Co., The, Refractories Div.

Carrier Corp.

Chain Belt Co.  
CONCENTCO—SEE DEISTER CONCENTRATOR CO.  
DEISTER CONCENTRATOR CO.  
Deister Machine Co.  
Goodrich Co., The B. F.  
Grinnell Co., Inc.  
Iowa Mfg. Co.  
LINK-BELT CO.  
Refrax—see Carborundum Co., The, Refractories Div.  
Rex—see Chain Belt Co.  
Spraying Systems Co.  
Yuba Manufacturing Co.

### SCRUBBERS

#### EXHAUST, DIESEL

Bodinson Mfg. Co.  
Eimco Corp., The  
Husky Engine Co. Ltd., The  
INTERNATIONAL HARVESTER CO.  
Oem Diesel Exhaust—see Oxy-Catalyst, Inc.  
Ruth Co., The  
TELLURIDE IRON WORKS CO.

#### GAS

Black, Sivalls & Bryson, Inc.  
Johnson-March Corp.  
Klockner-Humboldt-Deutz, A. G.  
National Tank & Pipe Co.  
OCM Catalytic Exhaust, Oxy Muffler Exhaust, OxyCat—see Oxy-Catalyst, Inc.  
Peterson Filters & Engr. Co.  
SANTA FE TANK DIV., FLOUR PRODUCTS CO.

STEARNS-ROGER MFG. CO., THE WESTERN PRECIPITATION CORP.  
Winslow Eng. & Mfg. Co.

#### SAND

ALLIS-CHALMERS MFG. CO., INDUSTRIES GROUP  
Bodinson Mfg. Co.  
Conveyor Co., The  
Grimm Crusher & Pulverizer Co.  
HACK ENGINEERING CO.  
HARDINGE CO., INC.  
Iowa Mfg. Co.  
LINK-BELT CO.  
Lippmann Engineering Works

MARCY—SEE MINE & SMELTER SUPPLY CO., THE

McLANAHAN & STONE CO.

MINE & SMELTER SUPPLY CO., THE

Rogers Iron Works Co.

Smith Engineering Works  
Straub Mfg. Co., Inc.

TELLURIDE IRON WKS.

Universal Dredge Mfg. Co.

Washington Machinery Co.

WEMCO—SEE WESTERN MACHINERY CO.

## Smelting & Refining Equipment

### SMELTING & REFINING EQUIPMENT

See Pyrometallurgical Equipment

### SOLVENTS URANIUM

see Reagents and  
Chemicals

### SPEED CHANGERS, INCREASERS AND/OR REDUCERS

Allis Co., The Louis  
ALLIS-CHALMERS MFG. CO.,  
INDUSTRIES GROUP  
Ampli-Speed—see Electric Machy.  
Mfg. Co.

BABER-GREENE CO.

Bodinson Mfg. Co.

BROWN INC., DAVID

Carpco Mfg. Inc.

Christian Engineers, J. D.

Cleveland Worm & Gear Co., The

Conveyer Co., The

Cutter-Hammer, Inc.

DEMAG AKTIENGESELLSCHAFT

Dodge Manufacturing Corp.

Electric Machinery Mfg. Co.

Falk Corp., The

Farrel-Birmingham Co., Inc.

General Dynamic Corp., Electro Dyn-

amic Div.

General Electric Co., Apparatus

Sales Div.

General Electric Co., International

HEWITT-RORINS, INC.

IN-LINE HELICAL—SEE LINK-

BELT CO.

Int'l General Electric Co.

Lima Electric Motor Co.

LINK-BELT CO.

Master Electric Co., The

Metron Instrument Co.

Morse Chain Co.

Multi-Mounts—see Sterling Elec.

Motors, Inc.

NATIONAL IRON CO.

National Supply Co., (Pa.)

Ohio Gear Co.

Oilgear Co., The

PARALLEL SHAFT GEAR—SEE

LINK-BELT CO.

Philadelphia Gear Works, Inc.

P.I.V.—SEE LINK-BELT CO.

RADICON—SEE BROWN INC.,

DAVID

Reeves—see Reliance Electric &

Engr. Co.

Reliance Electric & Engr. Co.

Rite-Lo-Speed—see Christian Engi-

neers, J.D.

SACO—SEE STEPHENS-ADAM-

SON MFG. CO.

Schoonmaker Co. Inc., P. G.

Shepard Niles Crane & Hoist Corp.

STEARN-ROGER MFG. CO.

Speedee—see Cleveland Worm &

Gear, The

STEPHENS-ADAMSON MFG. CO.

Sterling Electric Motors, Inc.

Synchromax—see U.S. Electrical Mo-

tors, Inc.

TELLURIDE IRON WORKS

Torque-Arm—see Dodge Mfg. Co.

U.S. Electrical Motors, Inc.

Universal Gear Works, Inc.

Vari-Drive—see U. S. Electrical

Motors, Inc.

VARI PITCH—SEE ALLIS-CHAL-

MERS MFG. CO.

Western Gear Corp. (Lynwood)

Western Gear Corp. (Wash.)

Western Gear Corp., Pacific Gear

Westinghouse Elec. Corp.

WESTINGHOUSE ELECTRIC IN-

TERNATIONAL CO.

Worthington Corp.

Yuba Manufacturing Co.

### SPIRALS

See Concentrators

### SPOTTERS, CAR

Advance Car Mover Co., Inc.

Aldon Company, The

Appleton—see Advance Car Mover

Corp.

Badger Line—see Advance Car

Mover Co., Inc.

Bodinson Mfg. Co.  
Brownie—see Sanford Day Iron  
Wks.

Christian Engineers, J.D.

Clyde Iron Works, Inc.

CONNELLSVILLE MFG. & MINE

SUPPLY CO.

Gregg Co., Ltd.

HEWITT-RORINS, INC.

Hugh Co., The Frank G.

Jeffrey Manufacturing Co., The

JOY MANUFACTURING CO.

LINK-BELT CO.

Noan Co., The

Nolan Porta-Feeder—see Nolan Co.

The

Sanford Day Wks.

STEPHENS-ADAMSON MFG. CO.

Superior-Lidgerwood-Mundy Corp.

Vulcan Iron Works (Pa.)

Bochumer Eisenhutte Heintzmann  
& Co.

Chapman-Dyer Steel Co.

COLORADO FUEL & IRON

CORP., THE

Commercial Shearing & Stamping

Co.

Rothe Erde Eisenwerk G.m.b.H.

### Yieldable Steel

Bethlehem Steel Corp.

Bethlehem Steel Export Corp.

Bodinson Mfg. Co.

C.F. & I.—SEE COLORADO FUEL

& IRON CORP., THE

COLORADO FUEL & IRON CORP.,

THE

Commercial Shearing & Stamping

Co.

Humboldt Div., Klockner-Humboldt

Deutz, A. G.

Jones & Laughlin Steel Corp.

Kaiser Steel Corp.

Mannesmann Export G.m.b.H.

NATIONAL IRON CO.

Ogden Iron Works Co.

Pacific Car & Foundry Co.

Pohlig, J., A.G.

Republic Steel Corp.

Ryerson & Son, Inc., Joseph T.

SHEFFIELD DIV., ARMCO STEEL

CORP.

TENNESSEAN COAL & IRON DIV.,

U. S. STEEL CORP.

U. S. STEEL CORP., AMERICAN

BRIDGE DIV.

UNITED STATES STEEL CORP.,

COLUMBIA-GENEVA DIV.

UNITED STATES STEEL EXPORT

CO.

USS—SEE UNITED STATES

STEEL CORP.

Youngstown Sheet & Tube Co., The

Yuba Mfg. Co.

### STOPERS

See Drills, Rock

### SURVEYING

#### INSTRUMENTS &

#### EQUIPMENT

See also Engineering and Drafting Equipment; Exploration Equipment

Equipment

Ainsworth & Sons, Inc., Wm.

Bausch & Lomb Optical Co.

Berger & Sons, Inc., C.L.

Brunton Transit—see Wm. Ains-

forth & Sons, Inc.

Detectoron Corp.

Eberline Inst. Div.—Reynolds Elect.

& Eng. Co.

Geo-Optic Co., Inc.

Georgi, W. & L.E.

International Geophysics, Inc.

Kern Instruments, Inc.

Keuffel & Esser Co.

Laisco—Los Angeles Scientific In-

strument Co.

Longyear Co., E. J.

Lufkin Rule Co.

Menlo Research Lab.

Precision Radiation Instruments,

Inc.

Radic Co., Inc., The

Rocky Mountain Instrument Co.

Rotolite Corp.

Universal Atomics

Victroline Instrument Co., The

White Instrument Co., David

WILD HEERBRUGG INSTRU-

MENTS, INC.

### TABLES

See Concentrators

### TANKS

See Thickeners and Tanks;  
Agitators and Conditioners

### TELEPHONES

See Communications

### TELEVISION,

### INDUSTRIAL

Du Mont Laboratories, Inc., Allen  
B.

International General Electric Co.

International Geophysical, Inc.

MINE SAFETY APPLIANCE CO.

Philips Electronics, Inc., Instru-

ments Div.

MILL CONTROL

ALLIS-CHALMERS MFG. CO.,

INDUSTRIES GROUP

Analytical Measurements, Inc.

Beckman Instruments, Inc., Scien-

tific Instruments Div.

BENDIX AVIATION CORP.

Bristol Co., The

Cutter-Hammer, Inc.

Euclid Electric & Mfg. Co.

Fischer & Porter Co.

General Electric Co., Apparatus

Sales Div.

INFILCO, INC.

LINK-BELT CO.

MASSCO-ADAMS—SEE MINE &

SMELTER SUPPLY CO.

MINE & SMELTER SUPPLY CO.

Norwood Controls Unit.

Philadelphia Gear Works, Inc.

Reliance Electric & Engineering

Co.

Westinghouse Electric Corp.

### PYROMETALLURGICAL CONTROL

ABC Scale Division, McDowell Co.,

Inc.

Barber-Colman Co.

Bristol Co., The

Foxboro Co., The

General Electric Co., Apparatus

Sales Div.

Leeds & Northrop Co.

Minneapolis-Honeywell Regulator

Co.

Pyro—see Pyrometer Instrument

Co., Inc.

Pyrometer Instrument Co., Inc.

Robertshaw-Fulton Controls Co.

Weston Instruments, Div. of Day-

strom, Inc.

Wheel Co., Instruments Div.

### RECORDERS

ABC Scale Division, McDowell Co.,

Inc.

Barber-Colman Co.

Bristol Co., The

Douglas & Givens

Electronics—see Minneapolis-Honey-

well Regulator Co.

Exterline Argus Co., Inc.

Fischer & Porter Co.

Foxboro Co., The

General Electric Co., Apparatus

Sales Div.

Industrial Physics & Electronics

Co.

### SWITCHES, RAIL

See Track and Accessories

**INFILCO, INC.**  
Leeds & Northrop Co.  
**LOGAN ENGR. CO.**  
**MINE SAFETY APPLIANCE CO.**  
Minneapolis-Honeywell-Heland Div.  
Minneapolis-Honeywell Regulator  
Co.

Penn Instrument Corp.  
Permit Co., The  
Pyrometer Instrument Co., Inc.  
Richardson Scale Co.  
Robertshaw-Fulton Controls Co.  
Seismograph Service Corp.  
Texas Instruments, Inc. (Dallas)  
Westinghouse Electric Corp.  
Weston Instruments Div. of Day-  
strom, Inc.  
Wheelco, Instruments Div., Bar-  
ber-Colman Co.

## THICKENERS AND TANKS

See also Cyclones

**STEEL TANKS**  
**ALLISON STEEL MFG. CO.**  
Bethlehem Steel Co.  
**BETHLEHEM STEEL EXPORT CORP.**

Bird Machine Co.  
Black, Sivals & Bryson, Inc.  
Rodinson Mfg. Co.  
Butler Mfg. Co.  
**COLUMBIAN STEEL TANK CO.**  
**DENVER EQUIPMENT CO.**  
**DORR-OLIVER, INC.**  
Eimco Corp., The  
Enterprise Eng. & Mach. Co.  
General American Transportation Corp.

Gregg Co., Ltd., The  
**HACK ENG. CO.**  
**HEAD WRIGHTSON, STOCKTON FORGE, LTD.**  
Hirach Bros. Machinery Co.  
Hydraulic Supply Mfg. Co.  
Kaiser Steel Corp.  
Klockner-Humboldt-Deutz, A. G.  
Link-Belt Co.  
Michigan Pipe Co.  
**MINERS FOUNDRY & MFG. CO.**  
Morris Bros. Machinery Co.  
Ogden Iron Works Co.  
Pollock Co., The Wm. B.  
Sanford-Day Iron Works Inc.  
Saracco Tank & Welding Co.  
**STEARNS-ROGER MFG. CO.**  
Washington Mach. Co.  
Wilmot Engineering Co.  
Yuba Manufacturing Div., Yuba Consolidated Industries, Inc.

### THICKENERS

**ALLISON STEEL MFG. CO.**

Butler Mfg. Co.  
Chain Belt Co.  
**COLUMBIAN STEEL TANK CO.**  
**DENVER EQUIPMENT CO.**  
**DORR-OLIVER, INC.**

Eagle Iron Works  
Eimco Corp., The  
Float-Treat Sea Chain Belt Co.  
**HARDINGE CO., INC.**  
Hirsch Bros. Machy. Co.  
International Combustion Ltd.  
Klockner-Humboldt-Deutz, A. G.  
**LINK-BELT CO.**  
**MINERS FOUNDRY & MFG. CO.**  
Morse Bros. Machinery Co.  
Order Iron Works Co.  
Santa Fe Tank Div., Fluor Prods. Co.

Saracco Tank & Welding Co.  
**STEARNS-ROGER MFG. CO.**  
WEMCO—SEE WESTERN MACHINERY CO.  
**WESTERN MACHINERY CO.**  
Westfälische Maschinenbau G.m.b.H.

### WOOD TANKS

**BAGAC—SEE MAHOGANY IMPORTING CO.**  
Black, Sivals & Bryson, Inc.  
**DENVER EQUIP. CO.**  
FEDERAL PIPE & TANK CO.  
MAHOGANY IMPORTING CO.  
Michigan Pipe Co.  
**MORSE BROS. MACHINE CO.**  
NATIONAL TANK & PIPE CO.  
Pacific Wood Tank Corp.  
Santa Fe Tank Div., Fluor Corp.  
**WINDELER CO., LTD., GEORGE**

## TIMBER

### CONNECTORS & TOOLS

Timber Engineering Co.

### MINE

Koppers Co., Inc.  
Osmose Wood Preserving Co. of America, Inc.

### SHAFT GUIDES

**BAGAC—SEE MAHOGANY IMPORTING CO.**  
**GENERAL HARDWOOD CO.**  
Stanton & Sons, Inc., E. J.

### TIMBER FRAMING MACHINES

STEARNS-ROGER MFG. CO.

## TIRES AND TUBES, OFF-HIGHWAY

Dunlop Rubber Co., Ltd.  
Firestone Tire & Rubber Co., The  
Gates Rubber Co.  
Goodrich Co., The B. F.  
Goodyear Tire & Rubber Co.  
**INTERNATIONAL B. F. GOODRICH**  
U. S. Royal—see U. S. Rubber  
United States Rubber Intl.

## TOOLS, AIR DRIVEN-

### PORTABLE

See also Drills, Rock

**ATLAS COPCO, AB SWEDEN**  
**ATLAS COPCO EASTERN, INC.**  
**ATLAS COPCO PACIFIC, INC.**  
Baldit Co.  
Boehle, Gebr. & Co. AG.  
**CHICAGO PNEUMATIC TOOL CO.**  
Consolidated Pneumatic Tool Co., Ltd.  
Dagenhardt-Utsch KG.  
Flottman-Werke, G.m.b.H.  
**GARDNER-DENVER CO.**  
Hausherr, Maschinenfabrik  
Hausherr, Rudolf & Son G.m.b.H.  
Holman Bros. (Canada) Ltd.  
Holman Bros. (England) Ltd.  
**INGERSOLL RAND CO.**  
JOY MFG. CO.  
Le Roi Div., Westinghouse Air Brake Co.  
Lorantco—see Newage Intl., Inc.  
National Supply Co., (Pa.)  
Porter, Inc., H. K.  
Premag, G.m.b.H.  
Schramm, Inc.  
Thor Power Tool Co.  
**VULCAN IRON WORKS CO.**  
Westinghouse Air Brake Co., Le Roi Div.  
Worthington Corp.  
Wright Power Saw & Tool Corp.

## TOOLS, INDUSTRIAL

### GUN

**MINE SAFETY APPLIANCE CO.**  
Remington Arms Co., Inc.  
Remington Industrial Gun—see Remington Arms Co.

### TOQUE CONVERTERS

SEE TRANSMISSIONS

## TRACK & ACCESSORIES

### RAIL AND TIES, STEEL

Aldon Co., The

**ALLISON STEEL MFG. CO.**

## BETHLEHEM PACIFIC COAST STEEL CORP.

Bethlehem Steel Co.  
Bethlehem Steel Export Corp.  
Brown Bowrie Cle A.G.  
**C P & SEE COLORADO FUEL & IRON CORP.**  
Central Frog & Switch Co., The  
**COLORADO FUEL & IRON CORP.**

Grego Co., Ltd., The

Koppers Co., Inc.

Mosebach Electric & Supply Co.

Reilly Tar & Chem. Co.

Ryerson & Son, Inc., Joseph T.

U.S. Industries, Inc.

**UNITED STATES STEEL CORP.**

**COLUMBIA-GENEVA DIV.**

**U. S. STEEL CORP., TENNESSEE COAL & IRON DIV.**

**UNITED STATES STEEL EXPORT CO.**

**USS—SEE U. S. STEEL CORP.**

**SWITCHES, FROGS, CROSSINGS, ETC.**

Aldon Company, The

**AMERICAN BRAKE SHOE CO., AMERICAN MANGANESE STEEL DIV.**

**AMERICAN MINE DOOR CO.**

**AMSCO—SEE AMERICAN BRAKE CO.**

**ATLAS CAR & MFG. CO., THE BETHLEHEM PACIFIC COAST STEEL CORP.**

Bethlehem Steel Co.

Bethlehem Steel Export Corp.

**CARD IRON WORKS CO., THE, C. S.**

Central Frog & Switch Co., The

**ELECTRI-THROW—SEE AMERICAN MINE DOOR CO.**

Gregg Co., Ltd., The

Hockensmith Corp., The

Jim Crow—see the Aldon Company

Mosebach Electric & Supply Co.

Nolan Co., The

Pettibone-Mulliken Corp.

Salzgitter Maschinen Aktiengesellschaft

Samson—see the Aldon Co.

Taylor-Wharton Iron & Steel Co.

U.S. Industries, Inc.

**USS—SEE U. S. STEEL CORP.**

**U. S. STEEL CORP., COLUMBIA-GENEVA DIV.**

United States Steel Export Co.

Weir Kilby Corp.

## TRACTORS &

### ATTACHMENTS

See Engine Exhaust Conditioners, Underground

### FORK LIFT TRUCKS

Hyster Co.

### TRACTORS

Agricat—see Joost Mfg. Co.

Allis-Chalmers Mfg. Co., Buda Div.

**ALLIS-CHALMERS MANUFACTURING CO., CONSTRUCTION MACHY. DIV.**

**ALLIS-CHALMERS MFG. CO., INDUSTRIES GROUP**

American Tractor Equipment Corp.

Autocar—see The White Motor Co.

Auto-Trac Div.

Brown Industries, David

Caterpillar Tractor Co.

**CLARK EQUIPMENT CO., CONSTRUCTION MACHY. DIV.**

**DROTT MFG. CORP.**

Eimco Corp., The

Federal Motor Truck Co., Div. of

Napco Industries, Inc.

**GENERAL MOTORS CORP., EUCLID DIV.**

**GENERAL MOTORS OVERSEAS OPERATIONS**

Hough Co., The Frank G.

Hyster Co.

**INTERNATIONAL HARVESTER CO.**

**INTERNATIONAL HARVESTER EXPORT CO.**

Joost Mfg. Co.

**JOY MFG. CO.**

Kaeble, Carl G.m.b.H.

**LE TOURNEAU-WESTINGHOUSE CO.**

Lulu Shovel Co., AB.

Minneapolis-Moline Co.

Oliver Corp., The

Pacific Car & Foundry Co.

Pence & Co., Inc., Earl H.

**PULLMAN—SEE INTERNATIONAL HARVESTER EXPORT CO.**

Service Supply Corp.

Skid-Shovel—see Drott Manufacturing Corp.

Skookum Co., Inc., The

Taylor-Wharton Iron & Steel Co.

**TOURNAPULL—SEE LE TOURNEAU-WESTINGHOUSE CO.**

Tracto-Rippers—see Tractomotive Corp.

Tracto-shovel—see Tractomotive Corp.

Tractomotive Corp.

**VICKERS-ARMSTRONGS (TRACTORS) LTD.**

Westinghouse Air Brake Co., Cleveland Rock Drill Div.

Westinghouse Air Brake Co., Le Roi Div.

Yuba Consolidated Industries, Inc.

Joost Mfg. Co.

Joy Mfg. Co.

Kaeble, Carl G.m.b.H.

Klockner-Humboldt-Deutz, A. G.—and Diesel Energy Corp.

**LE TOURNEAU WESTINGHOUSE CO.**

**MACK TRUCKS, INC.**

Mannsman Export G.m.b.H.

**MICHIGAN TURBO-DOZER—SEE CLARK EQUIPMENT CO.**

Minneapolis-Moline Co.

MRS Mfg. Co.

Napeo Industries, Inc.

Oliver Corp., The

Pence & Co., Inc., Earl H.

Performer—see Westfall Equipment Co.

Sheppard Co., R. H.

**TOURNATRACTORS—SEE LE TOURNEAU-WESTINGHOUSE CO.**

**VICKERS-ARMSTRONGS (TRACTORS) LTD.**

Westfall Equipment Co.

Westinghouse Air Brake Co., (Pa.)

Westinghouse Air Brake Co., Le Roi Div.

White Motor Co., The Autocar Div.

Wooldridge Mfg. Div., Continental Copper & Steel Industries

## ATTACHMENTS

Allis-Chalmers Mfg. Co., Buda Div.

**ALLIS-CHALMERS MANUFACTURING CO., CONST. MACHY. DIV.**

**AMERICAN BRAKE SHOE CO., AMER. MANGANESE STEEL DIV.**

American Tractor Equipment Corp.

**AMSCO—SEE AMERICAN BRAKE SHOE CO.**

Atco—see American Tractor Equip. Corp.

**BUCYRUS-ERIE—SEE INTERNATIONAL HARVESTER EXPORT CO.**

Carco—see Pacific Car & Foundry Co.

Carroll Tractor Parts—see Craig Carroll Co.

Caterpillar Tractor Co.

**CLARK EQUIPMENT CO., CONST. MACHY. DIV.**

Craig Carroll Co.

**DROTT MFG. CORP.**

Eimco Corp., The

EIMCO CORP., THE ELECTRIC STEEL FOUNDRY CO.

Gas Wood Industries, Inc.

**GENERAL MOTORS OVERSEAS OPERATIONS**

Heil Co., The

Hercules Gallion Products, Inc.

**HOUGH—SEE INTERNATIONAL HARVESTER EXPORT CO.**

Hough Co., The Frank G.

Hyster Co.

**INTERNATIONAL HARVESTER CO.**

**INTERNATIONAL HARVESTER EXPORT CO.**

Joost Mfg. Co.

**JOY MFG. CO.**

Kaeble, Carl G.m.b.H.

**LE TOURNEAU-WESTINGHOUSE CO.**

Lulu Shovel Co., AB.

Minneapolis-Moline Co.

Oliver Corp., The

Pacific Car & Foundry Co.

Pence & Co., Inc., Earl H.

**PULLMAN—SEE INTERNATIONAL HARVESTER EXPORT CO.**

Service Supply Corp.

Skid-Shovel—see Drott Manufacturing Corp.

Skookum Co., Inc., The

Taylor-Wharton Iron & Steel Co.

**TOURNAPULL—SEE LE TOURNEAU-WESTINGHOUSE CO.**

Tracto-Rippers—see Tractomotive Corp.

Tracto-shovel—see Tractomotive Corp.

Tractomotive Corp.

**VICKERS-ARMSTRONGS (TRACTORS) LTD.**

Westinghouse Air Brake Co., Cleveland Rock Drill Div.

Westinghouse Air Brake Co., Le Roi Div.

Yuba Consolidated Industries, Inc.

## TRAILERS

See Trucks and Trailers

## TRAMMERS

See Locomotives

**Manufacturer's Complete Names and Addresses are listed in Section II, last pages of this yellow section. Firms appearing in boldface caps carry advertisements in this issue.**

## Tramways, Aerial

### TRAMWAYS, AERIAL

#### BUCKETS

AMERICAN BRAKE SHOE CO.,  
AMER. MANGANESE STEEL  
DIV.

RIBLET TRAMWAY CO.  
Sanford-Day Iron Works, Inc.  
STEARNS-ROGER MFG. CO.  
U. S. STEEL CORP., AMERICAN  
STEEL & WIRE DIV.  
Yara Engineering Corp., Interstate  
Equipment Div.

#### CABLE

BETHLEHEM PACIFIC COAST  
STEEL CORP.

Bodinson Mfg. Co.  
British Ropes Ltd.

Canada Wire & Cable Co., Ltd.  
Leschen Wire Rope Div., H. K.  
Porter Co.

RIBLET TRAMWAY CO.  
Roeblings Sons Corp.

SAUERMAN BROS., INC.  
United States Steel Corp., Columbia-  
Geneva Div.

UNITED STATES STEEL  
EXPORT CO.

Washington Iron Works

#### TOWERS

ALLISON STEEL MFG. CO.

Bodinson Mfg. Co.

Gregg Co., Ltd. The

RIBLET TRAMWAY CO.

SAUERMAN BROS., INC.

STEARNS-ROGER MFG. CO.

TELLURIDE IRON WORKS,

Yara Engineering Corp., Interstate  
Equipment Div.

### TRANSFERS, CAR

AMERICAN MINE DOOR COMPANY

ATLAS CAR & MFG. CO., THE

Bodinson Mfg. Co.

CANTON—SEE AMERICAN

MINE DOOR COMPANY

CARD IRON WORKS CO., THE  
C. S.

Gregg Co., Ltd. The

International Engineering, Inc.

MAYO TUNNEL & MINE EQUIP.

Ogden Iron Works Co.

Sanford-Day Iron Works Inc.

TELLURIDE IRON WORKS CO.

UNITED STATES STEEL CORP.

Yuba Consolidated Industries, Inc.

### TRANSITS

See Surveying Instruments &  
Equipment

### TRANSMISSIONS

#### AND TORQUE

#### CONVERTERS

See also Torque Converters

ALLISON—SEE GENERAL MOTORS OVERSEAS OPERATIONS

American Blower Div. of American Standard

Berry—see Oliver-Iron & Steel Corp.

Caterpillar Tractor Co.

Cleveland Worm & Gear Co., The Dodge Mfg. Corp.

Flexidyne—see Dodge Mfg. Corp.

Four Wheel Drive Auto Co., The General Motors Corp., Allison Div.

GENERAL MOTORS OVERSEAS CORP.

Koppers Co., Fast's Coupling Dept.

Lima Electric Motor Co.

National Supply Co., The Oliver Iron & Steel Corp.

Philadelphia Gear Works, Inc.

Reeve—see Reliance Electric & Engineering Co.

Reeve Plier Co.

Reliance Electric & Engineering Co.

Schneider Mfg. Corp.

Sterling Electric Motors, Inc.

Twin Disc Clutch Co.

U. S. Electrical Motors, Inc.

Vari-dyne—see U. S. Electrical Motors, Inc.

Western Gear Corp. (Lynwood)

Western Gear Corp. (Wash.)

Western Gear Corp. Pacific Gear Plant

### TRIPPERS

See Conveyor Equipment

### TROLLEY EQUIPMENT

See also Locomotives

COLORADO FUEL & IRON CORP.

Elenco Corp., The

Jeffrey Mfg. Co.

Moesbach Electric & Supply Co.

Ohio Brass Co.

Ohio Hoist & Mfg. Co.

WESTINGHOUSE ELECTRIC INTERNATIONAL CO.

### TROMMELS

See Screens, Grizzlies, and Accessories

### TRUCKS

See Cars, Mine

### TRUCK AND TRAILERS

See also Haulage Units

#### ON-HIGHWAY

ALLISON STEEL MFG. CO.

Autocar—see White Motor Co., The Autocar Trucks Div.

Butler Mfg. Co.

Chrysler Corp., Dodge Div.

DART TRUCK CO.

FWD—Four Wheel Drive Auto Co., The

Federal Motor Truck Co.

Four Wheel Drive Auto Co., The Fruehauf Trailer Co.

Galion Allsteel Body Co.

General Motors Corp., GMC Truck & Coach Div.

GENERAL MOTORS OVERSEAS OPERATIONS

Hercules Steel Products

INTERNATIONAL—SEE INTERNATIONAL HARVESTER EXPORT CO.

International Harvester Co.

INTERNATIONAL HARVESTER EXPORT CO.

Kaelble, Carl G.m.b.H.

KENWORTH MOTOR TRUCK CORP.

Klockner-Humboldt-Deutz, A. G.

KOEHRING CO.

MACK TRUCKS INC.

Mannesmann Export G.m.b.H.

Moab Drilling Co.

Napco Industries, Inc.

Rogers Bros., Corp.

White Motor Co., The Autocar Trucks Div.

#### OFF-HIGHWAY

Atheny Products Corporation

Augsburg-Nurnberg A.G., Maschinenfabrik (M.N.)

Autocar—see The White Motor Co., The Autocar Trucks Div.

AVELING-BARFORD, LTD.

Butler Mfg. Co.

Chrysler Corp., Dodge Div.

DART TRUCK CO.

Easton Car & Construction Co.

Enterprise Engine & Mach. Co.

EUCLID—SEE GENERAL MOTORS OVERSEAS OPERATIONS

EUCLID DIV., GENERAL MOTORS CORP.

FWD—Four Wheel Drive Auto Co., The Federal Motor Truck Co.

Foden Ltd.

Four Wheel Drive Auto Co., The Fruehauf Trailer Co.

Galion Allsteel Body Co.

GENERAL MOTORS CORP., EUCLID DIVISION

### GENERAL MOTORS OVERSEAS OPERATIONS

GETMAN BROS. MFG. DIV. INC.

Gottwald, Leo

Heil Co., The

Hercules Steel Products Co.

INTERNATIONAL—SEE INTERNATIONAL HARVESTER EXPORT CO.

INTERNATIONAL HARVESTER CO.

IRWIN FOUNDRY & MINE CAR CO.

Kaelble, Carl G.m.b.H.

KENWORTH MOTOR TRUCK CORP.

KOEHRING CO.

Landis Steel Co.

LE TOURNEAU-WESTINGHOUSE CO.

MACK TRUCKS INC.

Marmon-Herrington Co., Inc.

Moab Drilling Co.

Napco Industries, Inc.

Ore Trucks, Inc.

Rogers Brothers Corp.

SCOOT-CRETE—SEE GETMAN BROS. MFG. DIV., INC.

TOURNAHOPPER — SEE LE TOURNEAU-WESTINGHOUSE CO.

TOURNAROCHER — SEE LE TOURNEAU-WESTINGHOUSE CO.

WESTINGHOUSE AIR BRAKE CO. (PA.)

WHITE MOTOR CO., THE AUTOCAR TRUCKS DIV.

TRUCK OR TRAILER BODIES

ALLISON STEEL MFG. CO.

EASTON CAR & CONSTRUCTION CO.

ENTERPRISE ENGINE & MACH. CO.

FRUEHAUF TRAILER CO.

GALION ALSTEEL BODY CO.

GAR WOOD INDUSTRIES INC.

GENERAL MOTORS OVERSEAS OPERATIONS

Gregg Co., Ltd., The

Heil Co., The

Hercules Steel Products Co.

Huckenmire Corp., The

Kenworth Motor Truck Co.

Landis Steel Co.

LE TOURNEAU-WESTINGHOUSE CO.

PENN—SEE HOCKENSIMITH CORP.

SCHWARTZ MFG. CO.

WINTER WEISS CO.

### TUNGSTEN CARBIDE

#### PRODUCTS

ADAMAS CARBIDE CORP.

AMERICAN BRAKE SHOE CO., AMERICAN MANGANESE STEEL DIV.

AMSCO—SEE AMERICAN BRAKE SHOE CO.

ATLAS COPCO, AB SWEDEN

ATLAS COPCO EASTERN, INC.

ATLAS COPCO PACIFIC, INC.

BRUNNER & LAY, INC.

CARBOLY—SEE GENERAL ELECTRIC CO.

EUTECTIC WELDING ALLOYS CORP.

FIRTH STERLING INC.

FIRTH STERLING—FIRTH STERLING INC.

GENERAL ELECTRIC COMPANY—CARBON

JOY DEPT., GENERAL ELECTRIC CO., METALLURGICAL

PRODUCTS DEPT.

HAYNES STELLITE CO.

HAYSTELLITE—SEE HAYNES STELLITE CO.

INTERNATIONAL ELECTRIC CO., ELECTRIC CO.

INTRA-SET—SEE BRUNNER & LAY, INC.

JUNCTION BIT & TOOL CO.

KENNAMETAL INC.

LONGYEAR CO., E. J.

MANCHESTER BIT CORP.

MCCAULEY INDUSTRIAL CORP.

METAL CARBIDE CORP.

NATIONAL CARBON CO.

NATIONAL CARBIDE CO.

ROK-BITS—SEE BRUNNER & LAY, INC.

STOOODY CO.

UDDEHOLM CO. OF AMERICA

VASCOLY-RAMET CORP.

WESTERN ROCK BIT MFG. CO.

### VACUUM FILTERS

See Filters

### VACUUM PUMPS

See Pumps

### VALVES

ALLEN-SHERMAN-HOFF PUMP CO., THE

ACF Industries, Inc., American Car Foundry Div.

AMERICAN BRAKE SHOE CO., AMER. MANGANESE STEEL DIV.

AMERICAN HARD RUBBER CO.

AMERICAN LOCOMOTIVE CO.

AMPCO METAL INC.

BARRETT, HAENTJENS & CO.

BRIDGEPORT BRASS CO.

BRISTOL CO., THE

CHASE BRASS & COPPER CO.

COEUR D'ALENE HARDWARE & FOUNDRY CO.

CRANE CO.

DURIRON CO., INC., THE

ELECTRIC STEEL FOUNDRY CO.

EQUIPMENT ENGINEERS, INC.

FARRIS FLEXIBLE VALVE CORP.

Farval Corp., The

Flex—see Farris Flexible Valve Corp.

FLEX-CHECK—SEE THE ALLEN-SHERMAN-HOFF PUMP CO.

Flexible Valve Corp.

Foster Engineering Co.

General-American Valve Co.

GOODRICH CO., B. F.

GRINNELL CO., INC.

GRINNELL-SAUNDERS—SEE GRINNELL CO., INC.

HAZELTON—SEE BARRETT, HAENTJENS & CO.

INFILCO, INC.

INTERNATIONAL B. F. GOODRICH

KREBS—SEE EQUIPMENT ENGINEERS, INC.

LEAD-LINED IRON PIPE CO.

LEDEEN MFG. CO.

LUNKENHEIMER CO., THE

MAG-PIPE POWER TRAP—SEE HANKINS CO., INC.

MASSCO GRIGSBY—SEE MINE & SMELTER SUPPLY CO., THE

MATHESON CO., INC., THE

MCNALLY PITTSBURGH CO.

MINE & SMELTER SUPPLY CO.

MINNEAPOLIS-HONEYWELL REGULATOR CO., INDUSTRIAL DIV.

OHIO BRASS CO.

PACIFIC PIPE CO.

PHILADELPHIA GEAR WKA., INC.

PORTER CO., INC., H. K., WS FITTINGS DIV.

ROCKWELL MFG. CO.

R-P-C VALVE DIV., AMERICAN CHAIN & CABLE CO., INC.

SUPER-SEAL FLEX—SEE FARRIS FLEXIBLE VALVE CORP.

UNITED STATES RUBBER CO.

VICTAULIC CO. OF AMERICA

WALWORTH CO.

WATER REGULATOR CO.

WESTERN PRECIPITATION CORP.

WESTINGHOUSE AIR BRAKE CO., THE

CLEVELAND ROCK DRILL DIV.

WESTINGHOUSE AIR BRAKE CO., THE

INDUSTRIAL PRODUCTS DIV.

### VENTILATION

#### EQUIPMENT AND BLOWERS

BRATTICE CLOTH AND TUBING ABC—SEE AMERICAN BRATTICE CLOTH CORP.

AMERICAN BRATTICE CLOTH CORP.

Arizona Bag Co.

BEMIS BRO. BAG CO.

HANOVER INDUSTRIES, INC.

KOROSEAL—SEE INTERNATIONAL B. F. GOODRICH

MINE FANS AND BLOWERS

Aeroodyne—see Jeffrey Mfg. Co., The

American Air Filter Co., Inc.

American Blower Div. of American Standard

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**AXIVANE**—SEE JOY MFG. CO.  
Brownie—see Sanford-Day Iron Wks.

Carrier Corp.  
Cleveland Worm & Gear Co., The  
Coppus Engineering Corp.  
**DEMAG A.G.**  
Drullard Co.—see Drullard Co., Howard  
Drullard Co., Howard  
**GRAYBAR ELECTRIC CO., INC.**  
Homelite Corp.  
**INGERSOLL-RAND CO.**  
International Engr., Inc.  
Jeffrey Mfg. Co.  
**JOY MFG. CO.**  
Koppers Co., Inc.  
Mannesmann Export G.m.b.H.  
**MINE SAFETY APPLIANCE CO.**  
NORTHERN BLOWER CO.  
Propellair—see Robbins & Myers, Inc.

Robbins & Myers, Inc.  
Roots-Conversville Blower  
Sanford-Day Iron Wks.  
Standard Elec. Mfg. Co., Inc.  
Sutorbilt Corp.  
Techn. Ind. en Handelsnerning  
Torex Manufacturing Co.  
Turbo-Maschinen A.G.  
U. S. Hoffman Machinery Corp.  
Vano—see Coppus Eng. Co.  
Ventair—see Coppus Eng. Co.  
**WESTINGHOUSE ELECTRIC INTERNATIONAL CO.**  
Westinghouse Electric Corp., Sturtevant Div.

#### VENTILATION PIPE AND TUBING

**ABC**—SEE AMERICAN BRATTICE CLOTH CORP.

Amaxair—see Cementation Co., Ltd., The

**AMERICAN BRATTICE CLOTH CORP.**

Arco Drainage & Metal Products, Inc.

Ayrtube—see Flexible Tubing Corp.

**BEMIS BRO. BAG CO.**

Carrier Corp.

Cementation Co., Ltd., The

Colonial Plastics Mfg. Co., The

DeLaval Steam Turbine Co.

Drucovent—see Drullard Co., Howard

Drullard Co., Howard

**DU PONT DE NEMOURS & CO., INC., FABRICS DIV.**

Fagertun Fabrikker A/S

Flexible Tubing Corp.

Goodrich Co., The B. F.

**HANOVER INDUSTRIES, INC.**

INTERNATIONAL B. F. GOODRICH

Johns-Manville Sales Corp.

**MINI-VENT**—SEE AMERICAN BRATTICE CLOTH CORP.

Naylor Pipe Co.

NEON—SEE AMERICAN BRATTICE CLOTH CORP.

Spiratube—see Flexible Tubing Corp.

**TELLURIDE IRON WKS.**

Torit Manufacturing Co.

**TRANSITE**—SEE JOHNS-MANVILLE

Van-Cor—see Colonial Plastics Mfg. Co., The

**VENTURE**—SEE DU PONT DE NEMOURS & CO., INC., FABRICS DIV.

#### VIBRATORS

See Bins, Chutes and Accessories

#### WASHERS LOG

**ALLIS-CHALMERS MFG. CO., INDUSTRIES GROUP**

All-State Welding Alloys Co., Inc.

Bodinson Mfg. Co.

Conveyor Co., The

Davis Foundry & Machine Works

Eagle Iron Works

Georgia Iron Works Co.

Humboldt, Klockner-Humboldt-

Deutz, A. G.

Iowa Mfg. Co.

Klockner-Humboldt-Deutz, A. G.

Knapp & Bates Ltd.

**LAKE SHORE INC.**

Linnan Engineering Works

**MCNALLY & STONE CO.**

McNally Pittsburgh Co.

Pioneer Engineering Div., Poor & Co., Inc.

Smith Engineering Works

Universal Engr. Corp.

Washington Machinery Co.

Yuba Mfg. Co.

#### WELDING EQUIPMENT, SUPPLIES AND SERVICES

##### EQUIPMENT

Abrasaweld—see Lincoln Electric Co.  
Airco—see Air Reduction Sales Co.  
Air Reduction Sales Co.  
**AMERICAN BRAKE SHOE CO.**  
**AMERICAN MANGANESE STEEL DIV.**  
American Chain & Cable Co., Inc., Page Steel & Wire Div.  
**AMSCO**—SEE AMERICAN BRAKE SHOE CO.

Auto Arc-Weld Mfg. Co.  
Borrmann-Brenner-Berlin  
Caterpillar Tractor Co.  
Fleetweld—see Lincoln Electric Co.  
Gar Wood Industries, Inc.  
General Electric Co., Apparatus Sales Div.

**HARNISCHFEGER CORP.**

Hobart Bros. Co.  
Ideal arc—see Lincoln Electric Co.  
Industrial Air Products Co.  
Jetweld—see Lincoln Electric Co.

Lincoln Electric Co.

Mosebach Electric & Supply Co.

Motor Generator Corp.

Oxi-Gasoline Cutting Torch—see Princeton Gripoist, Inc.

**RANKIN MFG. CO.**

Shield arc—see Lincoln Electric Co.  
Smith Welding Equipment Corp.  
**TELLURIDE IRON WKS.**  
Tweco Prod. Inc.

Union Carbide and Carbon Corp., Linde Air Products Company Div.

Victor Equipment Co.

Wall Colmonoy Corp.

**WESTINGHOUSE ELECTRIC INTERNATIONAL CO.**

Willson-Weld—see Willson Prod., Inc.

Willson Prod., Inc., Worthington Corp.

##### HARD FACING

Abrasaweld—see Lincoln Electric Co.

Airco—see Air Reduction Sales Co.

Air Reduction Sales Co.

All-State Welding Alloys Co., Inc.

**AMERICAN BRAKE SHOE CO.**

**AMER. MANGANESE STEEL DIV.**

Amoco Metal, Inc.

AMPCO-Trode—see Amoco Metal, Inc.

**AMSCO**—SEE AMERICAN BRAKE SHOE CO.

Auto Arc Weld Mfg. Co., The

Chromo-Loy—see Resisto-Loy Co.

Crucible Steel Co. of America

Deloro Stellite Ltd.

Eutectic Welding Alloys Corp.

Fleetweld—see Lincoln Electric Co.

General Electric Co., Apparatus Sales Div.

**HARNISCHFEGER CORP.**

Hascrome—see Haynes Stellite Co.

Haynes Stellite Co.

Haystellite—see Haynes Stellite Co.

Hobart Bros. Co.

Ideal arc—see Lincoln Electric Co.

Industrial Air Products Co.

Isorod—see Resisto-Loy Co.

Jetweld—see Lincoln Electric Co.

Lincoln Electric Co.

Linde Air Products Co.

Manga-Tone, N-M—see Resisto-Loy Co.

Manga-Kote—see Resisto-Loy Co.

Motor Generator Corp.

Multimet—see Haynes Stellite Co.

RANITE—SEE RANKIN MFG. CO.

Resisto-Loy Co.

Rexweld—see Crucible Steel Co. of Amer.

Roll Matrix—see All-State Welding Alloys Co., Inc.

Sanford-Day Iron Works, Inc.

Seaco—see Stulz-Sickles Co.

Shieldarc—see Lincoln Electric Co.

**STODY CO.**

Stulz-Sickles Co.

Taylor-Wharton Iron & Steel Co.

Union Carbide and Carbon Corp.

Haynes Stellite Co. Div.

Union Carbide and Carbon Corp.

Linde Air Products Co. Div.

Victor Equipment Co.

Wall Colmonoy Corp.

**WESTINGHOUSE ELECTRIC INTERNATIONAL CO.**

Linde Air Products Co.

**MINE SAFETY APPLIANCES CO.**

Motor Generator Co.

Shield Arc—see Lincoln Electric Co.

**SIMPLEX WIRE & CABLE CO.**

Smith Welding Equipment Corp.

Tweco Products, Inc.

Union Carbide and Carbon Corp.

Linde Air Products Co. Div.

Victor Equipment Co.

Westinghouse & Electric Corp.

**WESTINGHOUSE ELECTRIC INTERNATIONAL CO.**

##### WELDMENTS, STEEL

Falk Corp., The

#### WINCHES

See also Hoisting Equipment

##### ELECTRIC

Beaumont—see International Combustion Ltd.

Beebe Bros.

Bodinson Mfg. Co.

Brownie—see Sanford-Day Iron Wks.

##### CHICAGO PNEUMATIC TOOL CO.

Clyde Iron Works, Inc.

**DEMAG AKTIENGESELLSCHAFT**

Eisenhutt Prinz Rudolph, A.G.

Hasenclever, Maschinenfabrik A.G.

**HARNISCHFEGER CORP.**

**INGERSOLL-RAND CO.**

International Combustion Ltd.

**JOY MFG. CO.**

Kema (Kohn-Ehrenfelder Maschinenbau-Anstalt)

**LAKE SHORE, INC.**

**LEDEEN MFG. CO.**

**LINK-BELT CO.**

Lug-All Co., The

##### MOBILE DRILLING, INC.

Ohio Hoist & Mfg. Co.

R & M—see Robbins & Myers, Inc.

Robbins & Myers, Inc.

Round Chain Cos.

**SAUERMAN BROS., INC.**

Shepard Niles Crane & Hoist Corp.

**STEPHENS-ADAMSON MFG. CO.**

**VULCAN-DENVER**—SEE VULCAN IRON WORKS (DENVER)

**VULCAN IRON WORKS (DENVER)**

Western Gear Corp. (S. F.)

Westinghouse Electrical Corp.

Yale and Towne Mfg. Co.

Yuba Manufacturing Div., Yuba Consolidated Industries, Inc.

##### HAND

Beebe Bros.

Bodinson Mfg. Co.

Channon Corp., J. H.

Christian Engineers, J. D.

Clyde Iron Wks., Inc.

Coeur d'Alene Hardware & Foundry Co.

**GRIPOIST, INC.**

**HARNISCHFEGER CORP.**

**LEDEEN MFG. CO.**

**LINK-BELT CO.**

Lug-All Co.

Ohio Hoist & Mfg. Co.

Pacific Car & Foundry Co.

Princeton Gripoist, Inc.

Roberts & Schaefer Co.

Round Chain Cos.

**SAUERMAN BROS., INC.**

Stephens-Adamson Mfg. Co.

Western Gear Corp. (S. F.)

Yale and Towne Mfg. Co.

Yuba Manufacturing Co.

#### WIRE

See Cable and Conduit

#### WIRE CLOTH

See Screens, Grizzlies, and Accessories

#### WIRE ROPE

See Rope, Wire

#### XANTHATES

See Reagents and Chemicals

**Manufacturer's Complete Names and Addresses are listed in Section II, last pages of this yellow section. Firms appearing in boldface caps carry advertisements in this issue.**

## SECTION II

# Manufacturers' Index

### Advertisers in Boldface

**SECTION II** contains an alphabetical list of the names and complete addresses of the principal manufacturers of specialized MINE-MILL-SMELTER

equipment. The names of manufacturers who are represented in this issue by catalogs or advertisements are printed in **BOLDFACE** type.

## A

**A & A Mfg. Co., Inc.**, 712 So. 12th Street, Milwaukee 4, Wisconsin  
**ABC's Scale Division, McDowell Co., Inc.**, 16360 Waterloo Road, Cleveland 10, Ohio  
**Asen, Västera, Sweden**  
**Abrams Aerial Survey Corp.**, 606 East Shiawassee St., Lansing 1, Mich.  
**A.C.F. Industries, Inc.**, American Car & Foundry Div., 30 Church St., N.Y. 8, N.Y.  
**ACKER DRILL CO., INC.**, 725 W. LACKAWANA AVE., SCRANTON 3, PA.  
**Adams Carbide Co.**, 121 Market St., Kenilworth, N.J.  
**Advance Car Mover Co., Inc.**, 112 N. Outagamie St., Appleton, Wis.  
**Aero Service Corp.**, 210 E. Courtland St., Phila. 30, Pa.  
**Aero Service Corp. (Midcontinent)**, 1401 S. Detroit St., Tulsa, Okla.  
**Aero Service Corp. (Western)**, 33 Richards St., Salt Lake City, Utah  
**African Surveys (Proprietary Ltd.)**, 44 Negretti St., Johannesburg, U. of So. Africa  
**Agence Miniere & Maritime S. A.**, 2 Rue Van Bree, Anvers, Belgium  
**Ainsworth Wm. & Sons, Inc.**, 2151 Lawrence St., Denver 5, Colo.  
**Air Placement Equip. Co.**, 1009-11 W. 24th St., Kansas City 8, Mo.  
**Air Reduction Sales Co.**, 150 East 42nd St., New York 17, N.Y.  
**Alex Products, Inc.**, Schenectady 5, N.Y.  
**Alderman, Jr.**, Sidney S., 814 Newhouse Bldg., Salt Lake City 11, Utah  
**Aldon Company**, The, 3338 Ravenswood Ave., Chicago 13, Ill.  
**All-State Welding Alloys Co., Inc.**, 249-55 Ferris Ave., White Plains, New York  
**Allen & Garcia Co.**, 332 S. Michigan Ave., Chicago 4, Ill.  
**ALLEN-SHERMAN-HOFF PUMP CO., THE**, 259 E. LANCASTER AVE., WYNNEWOOD, PA.  
**Alliance Machine Co.**, Alliance, Ohio  
**Allied Chemical & Dye Corp.**, Barrett Div., 40 Rector St., New York 6, N.Y.  
**Allied Chemical & Dye Corp.**, General Chemical Div., 40 Rector St., New York 6, N.Y.  
**Allied Geophysics**, P.O. Box 583, San Jose, Calif.  
**Allied Steel & Tractor Products, Inc.**, 7835 Broadway, Cleveland 5, Ohio  
**Allied Witan Co., Inc.**, P.O. Box 2770, Cleveland, Ohio  
**Allis-Chalmers Mfg. Co.**, Buda Div., 1135 S. 70th St., Milwaukee 1, Wis.  
**ALLIS-CHALMERS MFG. CO., INDUSTRIES GROUP**, MILWAUKEE 1, WIS.  
**Allis-Chalmers Mfg. Co.**, Construction Machy. Div., Box 512, Milwaukee 1, Wis.  
**Louis Allis Co.**, The, 427 E. Stewart St., Milwaukee 1, Wis.  
**ALLISON STEEL MFG. CO., P.O. BOX 6867**, PHOENIX, ARIZ.  
**ALLOY STEEL & METALS CO.**, 1848 EAST 55TH ST., LOS ANGELES 58, CALIF.  
**Alphaduct Wire & Cable Co.**, P.O. Box 709, New Brunswick, N.J.  
**Alpine Laboratories, Ltd.**, 1610 South Nevada Ave., Colorado Springs, Colorado  
**Aluminum Co. of America**, 1501 Alcoa Bldg., Pittsburgh 19, Pa.  
**Amag-Hilpert-Pegnitzhutte A.G.**, Werke Pegnitz, Nurnberg, Germany  
**America Corp.**, 4809 Firestone Blvd., Southgate, Calif.  
**American Air Filter Co.**, 215 Central Ave., Louisville 8, Ky.  
**American Blower Div. of American Standard**, Detroit 32, Mich.  
**AMERICAN BRAKE SHOE CO.**, 530 5TH AVE., NEW YORK 36, N.Y.  
**American Brake Shoe Co.**, Ramapo Ajax Div., Export Div., 230 Park Ave., New York 17, N.Y.  
**AMERICAN BRAKE SHOE CO., AMERICAN MANGANESE STEEL DIV.**, 289 E. 14TH ST., CHICAGO HEIGHTS, ILL.  
**AMERICAN BRATTICE CLOTH CORP.**, 238 E. BUFFALO ST., WARSAW, IND.

**American Chain & Cable Co.**, Page Steel & Wire Div., Monessen, Pa.  
**American Chain & Cable Co.**, Helicord Gage Div., Bridgeport 2, Conn.  
**American Chain & Cable Co., Inc.**, American Cable Div., York, Pa.  
**American Chain & Cable Co., Inc.**, American Chain Div., Princess & Charles Sts., York, Pa.  
**American Chain & Cable Co., Inc.**, Hazard Wire Rope Div., Wilkes-Barre, Pa.  
**American Chain & Cable Co., Inc.**, R-P&C Div., Reading, Pa.  
**American Chain & Cable Co., Inc.**, Wire Rope Div., 271 S. Pennsylvania Ave., Wilkes-Barre, Pa.  
**American Chain & Cable Co., Inc.**, Wright Hoist Div., York, Pa.  
**American Colset Co.**, 87-89 Court St., Paterson, N.J.  
**American Cyanamid Co.**, Explosive Dept., 30 Rockefeller Plaza, New York 20, N.Y.  
**AMERICAN CYANAMID CO.**, MINERAL DRESSING DEPT., 30 ROCKEFELLER PLAZA, NEW YORK 20, N.Y.  
**American Forge Co.**, Niles, Calif.  
**American Hard Rubber Co.**, 93 Worth St., New York 13, N.Y.  
**American Hoist & Derrick Co.**, Crosby-Loughlin Div., 63 S. Robert St., St. Paul 1, Minn.  
**American LaFrance Corp.**, 148 E. LaFrance St., Elmhurst, New York  
**American Locomotive Co.**, 30 Church St., N.Y., N.Y.  
**American M.A.N. Corp.**, 149 Broadway, New York 6, N.Y.  
**AMERICAN MINE DOOR CO.**, 2071 DUEBER AVE., S. W. CANTON 6, OHIO  
**American Optical Co.**, Southbridge, Mass.  
**AMERICAN POTASH & CHEMICAL CORP.**, 3030 W. 6TH ST., LOS ANGELES 54, CALIF.  
**American Rubber Mfg. Co.**, 1145 Park Ave., Oakland, Calif.  
**AMERICAN SMELTING & REFINING CO.**, 5250 S. STATE & MC CORMICK BLDG., SALT LAKE CITY, UTAH  
**American Tractor Equipment Corp.**, 9131 San Leandro Blvd., Oakland 3, Calif.  
**AMERICAN ZINC SALES CO.**, 1630 PAUL BROWN BLDG., ST. LOUIS, MO.  
**Ames Co.**, W. R., 1001 Dempsey Rd., Milpitas, Calif.  
**Ampeco Metal, Inc.**, 1716 South 38th St., Milwaukie 46, Wis.  
**ANACONDA WIRE & CABLE CO.**, 25 BROADWAY, NEW YORK CITY 4, N.Y.  
**Analytical Measurements, Inc.**, 585 Main St., Clifton Park, N.Y.  
**Andreas Stihl Maschinenfabrik**, Waiblingen Newstadt/Wurtt, Germany  
**Ansonia Wire & Cable Co.**, The, 11 Martin St., Ashton, Rhode Island  
**Apache Powder Co.**, Box 518, Benson, Arizona  
**Appleton-Atlas Car Mover Corp.**, 1421-25 S. 2nd St., Milwaukee 4, Wisconsin  
**Arizona Assay Office**, 815 N. First St., Phoenix, Ariz.  
**Arizona Bag Co.**, 1502 So. 23rd Ave., Phoenix, Ariz.  
**ARIZONA TESTING LABORATORIES**, 817 WEST MADISON ST., P.O. BOX 1888, PHOENIX, ARIZ.  
**Armed Drainage & Metal Products, Inc.**, 703 Curtis St., Middletown, Ohio  
**Armed Steel Corp.**, 703 Curtis St., Middletown, Ohio  
**Armour Chemical Division**, 1355 West 31st St., Chicago 9, Ill.  
**Armstrong-Bray & Co.**, 5366 Northwest Highway, Chicago 30, Ill.  
**ASEA ELECTRIC INC.**, 530 FIFTH AVE., N.Y.C., N.Y.—SEE ASEA  
**ASEA, VÄSTERÅS, SWEDEN**  
**Askania-Werke A.G.**, Berlin-Friedenau, Germany  
**Athey Products Corp.**, 5631 West 65th St., Chicago 38, Ill.  
**Atlantic Refining Co.**, The, 260 South Broad St., Philadelphia 2, Pa.  
**ATLAS CAR & MFG. CO.**, 1110 IVANHOE RD., CLEVELAND 18, OHIO  
**ATLAS COPCO EASTERN, INC.**, P.O. BOX 2568, PATERSON 25, N.J.

**ATLAS COPCO PACIFIC, INC.**, 920 BRITAN AVE., SAN CARLOS, CALIF.  
**ATLAS COPCO, A. B. STOCKHOLM 1, SWEDEN**  
**Atomic Engineering Corp.**, 424 S. 7th St., P.O. Box 1701, Grand Junction, Colo.  
**ATLAS POWDER COMPANY**, WILMINGTON 99, DELAWARE  
**Augsburg-Nürnberg A. G. Maschinenfabrik (M.A.N.)**—See American M.A.N. Corp.  
**August Thysen-Hütte A. G.**, Franz-Leesestrasse 3, Duisburg-Hamborn, W. Germany  
**Autair, Ltd.**, 75 Wigmore Street, London W. 1, England  
**Auto-Arc-Weld Mfg. Co.**, The, 9615 Meach Ave., Cleveland 6, Ohio  
**Autocar Trucks Division**, White Motor Co., Exton, Pa.  
**AVELING-BARFORD, LTD.**, GRANTHAM, LINCOLNSHIRE, ENGLAND

## B

**B.I.F. Industries, Inc.**, 345 Harris St., Providence, R.I.  
**BABCOCK & WILCOX CO.**, BOILER DIV., THE, 161 EAST 42ND ST., NEW YORK 17, N.Y.  
**Badger Fire Extinguisher Co.**, Chase St., Methuen, Mass.  
**Bailey & Van Horn**, Box 7, Murphy, N.C.  
**Baldwin-Lima-Hamilton Corp.**, 2232 Philadelphia Nat. Bank Bldg., Philadelphia 7, Pa.  
**Baldwin-Lima-Hamilton Corp.**, Eddystone Div., Philadelphia 42, Pa.  
**BALDWIN-LIMA-HAMILTON CORP.**, LIMA-HAMILTON DIV., PHILADELPHIA 42, PA.  
**Band It Co.**, 24th & Dahlia, Denver 16, Colo.  
**Barber-Colman Co.**, 1300 Rock St., Rockford, Ill.  
**BARRIER-GREENE CO.**, 400 NORTH HIGH-LAND AVE., AURORA, ILLINOIS  
**Barco Mfg. Co.**, 500 Hough St., Barrington, Illinois  
**BARRETT, HAENTJENS & CO.**, P.O. BOX 36, HAZLETON, PA.  
**Bartell, A.O.**, 308 Woodlark Bldg., Portland, Ore.  
**Bath Iron Wks. Corp.**, Rm. 1738, West Chester, Pa.  
**Baukau, Philip J.**, 2131 University Ave., Berkeley, Calif.  
**Bausch & Lomb Optical Co.**, 682 St. Paul St., Rochester, New York  
**Bavaria Maschinenfabrik**, J. Hilber, Industriestraße 34 Neu-Ulm (Donau) Germany  
**Baxter, Ltd.**, W. H., 71 Gelderd Rd., Leeds 12, Yorkshire, England  
**Bay City Shovels, Inc.**, Bay City, Mich.  
**Bean Rubber Mfg. Co.**, 1623 So. 10th St., San Jose, Calif.  
**Becker-Prunke, GmbH**, Datteln (Westf) W. Germany  
**Beckman Instruments, Inc.**, Scientific Instruments Div., 2500 Fullerton Road, Fullerton, Calif.  
**Bedford & Sons, Ltd.**, John-Lion Works, Sheffield, Yorks, England  
**Beebe Bros.**, 2724 Sixth Ave., S. Seattle 4, Wash.  
**BELL HELICOPTER CORP.**, P.O. BOX 482, FT. WORTH 1, TEXAS  
**BEMIS BROS BAG CO.**, 408 PINE ST., BOX 23, ST. LOUIS 2, MO.  
**Bendix, F.N.**, First National Bank, Joplin, Mo.  
**BENDIX AVIATION CORP.**, CINCINNATI DIV., 3130 WASSON RD., CINCINNATI 8, OHIO  
**Bennets Chemical Laboratory, Inc.**, 901 S. Ninth Street, Tacoma 3, Wash.  
**Bergen & Sons, Inc.**, C.L., 87 Williams St., Boston 15, Mass.  
**F. W. Berk & Co., Inc.**, 275 Brannan St., San Francisco 7, Calif.

Berk & Co., Inc., F.W., Park Place East  
Wood Ridge, N.J.  
Berman Chem. Co., 712 Superior St., Toledo  
4, Ohio

**BETHLEHEM PACIFIC COAST STEEL CORP.**, 20TH & ILLINOIS STREETS,  
SAN FRANCISCO, CALIFORNIA

Bethlehem Steel Co., Bethlehem, Pa.  
Bethlehem Steel Export Corp., 25 Broadway,  
N.Y. 4, N.Y.

Bico, Inc., 3116 Valhalla Drive, Burbank,  
Calif.

Bin-Dicator Co., The, 13946 Kercheval Ave.,  
Detroit 15, Mich.

Bird Machine Co., South Walpole, Mass.  
Birdsboro Steel Foundry & Machine Co., Birdsboro,  
Pa.

Biachoff-Werke KG, vorm. Pfingstmann-Werke,  
Hellbachstr 84-86, Recklinghausen-Sud,  
Germany

Bixby-Zimmer Engineering Co., 981 Abingdon  
St., Galesburg, Ill.

**BLACK & DEASON, BOX 1888, SALT LAKE CITY 1, UTAH**

**BLACK'S MINING EQUIPMENT, LTD., 167 MASON'S HILL, BROMLEY, KENT, ENGLAND**

Black, Sivalls & Bryson, Inc., 7500 E. 12th St.,  
Kansas City 26, Mo.

Blackburn International Corp., 149 Broadway,  
New York 6, N.Y.

Blackhawk Mfg. Co., Milwaukee 46, Wis.  
Blaw-Knox Co., Blaw-Knox Div., Farmers  
Bank Bldg., Pittsburgh, Pa.

Bochumer Eisenhutte Heintzmann & Co.,  
Bochum, Germany

Bobinson Mfg. Co., 2401 Bayshore Blvd., San  
Francisco 24, Calif.

Bohler, Gebr. & Co., AG, Hansa-Allee 321,  
Dusseldorf-Oberkassel, Germany

Bonded Scale & Machine Co., 69 Kingston,  
Columbus, Ohio

Bookline, Incorporated, 3735 South 3100 East  
St., Salt Lake City 9, Utah

**BOOTH CO., INC., THE, 333 W. 14TH ST., SALT LAKE CITY 4, UTAH**

Borg-Warner Ind.—see Morse Chain Co.,  
N.Y.

Borrman-Brenner-Berlin, Blucherstrasse 28,  
Berlin S.W. 61, Germany

Borsig, AG, Berliner Str. 19-37, Berlin-Tegel  
(Westsektoren), Germany

Boston Woven Hose & Rubber Co., P.O. Box

1071, Boston 3, Mass.

Bowill Co., The, Boylan Ave., S. E. Canton,  
Ohio

**BOYLES BROS. DRILLING CO., 1321 S. MAIN ST., SALT LAKE CITY, UTAH**

**BOYLES BROS. DRILLING CO., LTD., 1275-91 PARKER ST., VANCOUVER 6, B.C., CANADA**

Braun & Co., C. F., 1000 Fremont Avenue, Alhambra, Calif.

Braun Corp., 2260 E. 15th St., Los Angeles  
21, Calif.

Braun-Knecht-Helman Co., 1400 16th St., San  
Francisco 19, Calif.

Bridgeport Brass Co., 30 Grand St., Bridgeport,  
Conn.

Briggs & Stratton Corp., 2711 North Thirteenth  
St., Milwaukee 1, Wis.

Bristol Co., The, P.O. Box 1790 MW Waterbury  
20, Conn.

British Insulate Callender Cables, Ltd., Norfolk  
House, Norfolk St., London W.C. 2, England

British Jeffrey-Diamond Ltd. Stennard Works,  
Wakefield, Yorks, England

British Ropes Ltd., Doncaster, Yorkshire (Eng-

land)

British Ropes Ltd., Export Sales Div., 52 High  
Holborn, London, England

British Ropeway Engineering Co., Ltd., Plantation  
House, Mincing Lane, London E.C., England

Broadbent & Son, Ltd., Robert Phoenix Iron-  
works, Stalybridge, England

Broderick & Bascom Rope Co., 4203 Union  
Blvd., St. Louis 15, Missouri

**BROWN INC., DAVID, 999 BEECHER ST., SAN LEANDRO, CALIF.**

Brown, Industries, David, Meltham, Huddersfield,  
England

Brown Bovier & Cie. AG, Mannheim, Ger-

**BRUNNER & LAY, INC., 9300 KING ST., FRANKLIN PARK, ILL.**

Buck & Associates, Carl, Essex Falls, N.J.  
**BUCYRUS-ERIE CO., P.O. BOX 56, SOUTH MILWAUKEE, WIS.**

Buda Co., (Div. of Allis-Chalmers Mfg. Co.),  
Harvey, Ill.

Buell Engineering Co., Inc., 70 Pine St., New  
York 5, New York

Bullard Co., E. D., 2680 Bridgewater, Sausalito,  
Calif.

**BUNKER HILL & SULLIVAN MINING & CONCENTRATING CO., BOX 29, KELLOGG, IDAHO**

Butler Mfg. Co., 7400 E. 13th St., Kansas  
City 26, Mo.

Byron Jackson Pumps, Inc., P.O. Box 2017A,  
Terminal Annex, Los Angeles, Calif.

C & D Batteries, Inc., Conshohocken, Pa.  
C M G Industries Inc., 615 S. 2nd St., Laramee,  
Wyo.

California Texas Oil Co., Ltd., 380 Madison  
Ave., New York, N.Y.

Calumet & Hecla, Inc., Calumet Div., 1 Calumet  
Ave., Calumet, Mich.

Campbell Chain Co.

Canada Wire & Cable Co., Ltd., P. S. "R."

Toronto 17, Ontario, Canada

Canadian Aero Service Ltd., 348 Queen St.,  
Ottawa 4, Ontario, Canada

Canadian Safety Fuse Co. Ltd., Brownsburg,  
Quebec, Canada

Canton Mfg. Co., 2408 13th St., N. E., Canton  
5, Ohio

Carborundum Co., The, Refractories Div.,  
Perth Amboy, N.J.

**CARD IRON WORKS CO., THE C. S., P.O. BOX 117, DENVER 1, COLO.**

Cardon Corp., 307 N. Michigan Ave., Chicago,  
Ill.

Carey, Philip, Mfg. Co., Wayne Ave., At  
Cooper, Cincinnati, Ohio

Carlson Products Corp., 10225 Meech Ave.,  
Cleveland 5, Ohio

Carlyle Rubber Co., Inc., 103-107 Warren St.,  
New York 7, N.Y.

Carol Cable Co., 190 Middle St., Pawtucket,  
Rhode Island

Carpro Mfg. Inc., P.O. Box 3272, Jacksonville  
6, Fla.

Carrier Corp., 300 So. Geddes St., Syracuse,  
N.Y.

Carrier Conveyor Corp., 211 N. Jackson St.,  
Louisville, Ky.

Caterpillar Tractor Co., Peoria, Illinois

Cecil S. A., P.O. Box 241, Luxembourg

**CEMENT GUN CO., ALLENTOWN, PA.**

Cementation Co., Ltd.—The, Bentley Works,  
Doncaster, Head office: 20 Albert Embankment,  
London, S.E. 11.

Central Frog & Switch Co., The, Box 95, Sta.  
O, Cincinnati 8, Ohio

Central Mine Equipment Co., 6200 N. Broad-  
way, St. Louis 15, Mo.

Central Scientific Co. of California, 1040 Mar-  
tin Ave., Santa Clara, Calif.

Centrifugal & Mechanical Industries, Inc., 146

President St., St. Louis 18, Mo.

Cesinalia s.p.a., Via Felice-Cassati 44, Milan,  
Italy

Chain Belt Co., 4701 West Greenfield Ave.,  
Milwaukee 1, Wis.

Chain Belt Co., Schaefer Bearing Div., Downers  
Grove, Illinois

Channon Corp., J. H., 1447-55 West Hubbard  
St., Chicago 22, Ill.

**CHAPMAN & WOOD, 536 JEFFERSON ST., N. E., ALBUQUERQUE, NEW MEX.**

Chapman Dyer Steel Co., 820 S. Euclid, Tucson,  
Ariz.

Charlton Laboratories, 2340 S. W. Jefferson  
St., Portland 7, Ore.

Chase Brass & Copper Co., 236 Grand St.,  
Waterbury 20, Conn.

Chester Hoist—see National Screw & Mfg. Co.,  
Chicago Eye Shield Co., 2727 W. Roscoe St.,  
Chicago 19, Ill.

**CHICAGO PNEUMATIC TOOL CO., 8 EAST 44TH ST., NEW YORK, N.Y.**

**CHIKSAN CO., 330 N. POMONA AVE., BREA, CALIF.**

**CHRISTENSEN DIAMOND PRODUCTS CO., 1937 S. 2ND WEST P.O. 387, SALT LAKE CITY, UTAH**

Chrysler Corp.-Dodge Div., 21500 Mound  
Road, Detroit 31, Mich.

Circle Wire & Cable Corp., 5500 Maspeth Ave.,  
N. Y.

**CLARK EQUIPMENT CO., CONSTRUCTION MACHINERY DIV., P.O. BOX 599, PIPESTONE PLANT BENTON HARBOR, MICH.**

Clarkson Co., The, 564 Market St., San Fran-  
cisco 4, Calif.

Cleveland Rock Drill Div., Westinghouse Air  
Brake Co., Cleveland, Ohio

Cleveland Vibrator Co., The, 2828 Clinton  
Ave., Cleveland 13, Ohio

Cleveland Wire Cloth & Mfg. Co., 3573 E.  
78th St., Cleveland 5, Ohio

Cleveland Worm & Gear Co., The, 3249 East

80th St., Cleveland 4, Ohio

Climax Molybdenum Co., 500 Fifth Ave., N.Y.  
36, N.Y.

Climax Rock Drill & Engineering Works, Ltd.,  
4, Broad St. Place, London, E.C.2, Eng-  
land

Clipper Belt Lacer Co., 974 Front Ave., N.W.  
Grand Rapids 2, Mich.

Clyde Iron Works, Inc., Duluth 1, Minnesota

**COAST MPG. & SUPPLY CO., BOX 71, LIVERMORE, CALIF.**

Coeur d'Alene Hardware & Foundry Co., Box

969, Wallace, Idaho

Coffing Hoist Div., Duff Norton Co., Danville,  
Ill.

**COLEMAN CABLE & WIRE CO., 3919 WES-LEY TERRACE SCHILLER PARK, ILL.**

Collyer Insulated Wire Co., 245 Roosevelt  
Ave., Pawtucket, R.I.

Colonial Plastics Mfg. Co., 2685 E. 79th St.,  
Cleveland 4, Ohio

**COLORADO ASSAYING CO., THE, 2013 WELTON ST., DENVER 1, COLO.**

**COLORADO FUEL & IRON CORP., P.O. BOX 1920, DENVER, COLO.**

**COLORADO IRON WORKS CO., 2888 RACE ST., DENVER 5, COLO.**

**COLUMBIA STEEL CASTING CO., INC., 933 N. W. JOHNSON ST., PORTLAND 9, ORE.**

**COLUMBIAN STEEL TANK CO., 1509 WEST 12TH ST., KANSAS CITY 1, MO.**

Combustion Engineering Inc., Raymond Div.,  
1315 N. Branch St., Chicago 22, Ill.

Combustion Engineering, Inc., 200 Madison  
Ave., New York 16, New York

Commercial Shearing & Stamping Co., 1775  
Logan Ave., Youngstown 1, Ohio

Connecticut Telephone & Electric Corp.,  
Meriden, Conn.

**CONNELLSVILLE MFG. & MINE SUPPLY CO., S. 4TH ST., CONNELLSVILLE, PA.**

Conrad-Stork, P.O. Box 134, Haarlem, Holland

Consolidated Pneumatic Tool Co., Ltd., 232  
Dawes Rd., London, S. W. 6, England

Construction Mach. Co., Box 120, Waterloo,  
Iowa

Continental Gin Co., 4500-5th Ave., South,  
Birmingham, Ala.

Continental Motors Corp., 205 Market St.,  
Muskegon, Mich.

Convair Inc., P.O. Box 9671, Pittsburgh 26,  
Pa.

Conveyor Co., The, 3260 East Slauson Ave.,  
Los Angeles 58, Calif.

Cooper-Bessemer Corp., The, Mount Vernon,  
Ohio

Coppin Engineering Corp., 344 Park Ave.,  
Worcester 10, Mass.

**COWIN & CO., INC., 1-18TH ST. S.W., BIRMINGHAM, ALA.**

Craig Carroll Co., 56 S.E. Belmont, (Box  
2208), Portland 14, Oregon

Crane Co., 836 S. Michigan Ave., Chicago 5,  
Ill.

Crescent Belt Fastener Co., 480 Lexington  
Ave., New York 17, N.Y.

Crown Zellerbach Corp., 343 Sansome St., San  
Francisco 19, Calif.

**CROWN ZELLERBACH CORP., 343 SAN-SOME ST., SAN FRANCISCO 19, CALIF.**

Crucible Steel Co. of America, Henry W.  
Oliver Bldg., Mellon Square, P.O. Box 88,  
Pittsburgh 30, Pa.

Crusher Eng. Div., Poor & Co., 400 Archi-  
tects Bldg., Philadelphia 3, Pa.

Cummins Engine Co., Inc., Fifth & Union  
St., Columbus, Ind.

Custom Assay Office, Box 811, El Paso, Texas

Custom Products Co., P.O. Box 790, Carson  
City, Nevada

Cutter-Hammer, Inc., 315 N. 12th St., Mil-  
waukee 1, Wis.

## D

Dagenhardt-Utsch KG, Eisem (KR-Siegen)  
Germany

**DALE, WADE M., 238 E. POLK ST., COAL-INGA, CALIF.**

Davey Compressor Co., Kento, Ohio

Davis & Davis, 2532 Lambourne Ave., Salt  
Lake City, Utah

Davis Foundry & Machine Works, Rome, Ga.

Dayton Rubber Co., Woodside Bldg., Green-  
ville, S.C.

Dean Bros. Pumpa, Inc., 323 West 10th St.,  
Indianapolis 7, Indiana

Deason & Nichols, 160 South West Temple  
St., Salt Lake City 1, Utah

**DEGGENDORFER, T. G., BOX 840, KELLOGG, IDAHO**

**DEISTER CONCENTRATOR CO., 225 GLAS-GOW AVE., FORT WAYNE, IND.**

Deister Machine Co., 1933 E Wayne St., Ft.  
Wayne 4, Ind.

Deloro Stellite Ltd., Highlands Rd., Shirley,  
Solihull, Warwickshire, England

Deming Co., Salem, Ohio

**DENVER EQUIPMENT CO., Box 5268 (1400-17TH ST.), DENVER 17, COLO.**

**DENVER FIRE CLAY CO., 2301 BLAKE ST., P.O. BOX 5510, DENVER 17, COLORADO**

Detector Corp., 5528 Vineland Ave., North  
Hollywood, Calif.

DeLaval Steam Turbine Co., 300 Nottingham  
Way, Trenton 2, N.J.

**DEMAG AKTIENGESELLSCHAFT, WOLFGANG-Reuter-PLATZ, DÜSSELDORF, GERMANY**

Demag, Electrometallurgie GmbH, Wolfgang-  
Reuter-Platz, Duisburg, Germany

De Souza & Co., E. E., Inc., 217 Broadway,  
New York, N.Y.

Devcon Corp., Danvers, Mass.

**DIAMOND DRILL CONTRACTING CO., SOUTH 18 STONE ST., P.O. BOX 4065, STATION B, SPOKANE, WASHING-  
TON**

Diamond Iron Works Div., Goodman Mfg. Co.,  
Halsted St. & 48th Pl., Chicago 9, Ill.  
**DIAMOND TOOL RESEARCH CO., INC.**, 339  
2ND AVE., N.Y. 10, N.Y.  
Diamond Chain Co., Inc., 402 Kentucky Ave.,  
Indianapolis, Ind.  
Dicalite Div., Great Lakes Carbon Corp.  
**DICKINSON LABORATORIES**, 1300 W.  
MAIN ST., BOX 7006, EL PASO, TEXAS  
**DIESEL ENERGY CORP.**, 82 BEAVER ST.,  
NEW YORK, N.Y.—SEE KLOCKNER-  
HUMBOLDT-DEUTZ

Dietagen Co., Eugene, 2425 North Sheffield,  
Chicago, Ill.

Differential Steel Car Co., Findlay, Ohio  
Dings Magnetic Separator Co., 4740 West  
Electric Ave., Milwaukee 46, Wis.

Dodge Mfg. Corp., S. Union St., Mishawaka,  
Ind.

Dolmar Machine Fabrik, Kedenburg Strasse  
53-59 Hamburg-Wandsbek, Germany

Dorman & Co. Ltd., W.H.-Tixall Road Works,  
Stafford, England

**DORR-OLIVER INC.**, BARRY PLACE,  
STAMFORD, CONN.

Dorr Oliver GmbH, Gustav-Freytag Strasse 9,  
Weisbaden, Germany

**DOWN CHEMICAL CO., THE MIDLAND**,  
MICH.

**DRAGO CORP., NEVILLE ISLAND**, PITTS-  
BURGH 25, PA.

Drilling Accessory & Mfg. Co., Inc., P. O.  
Box 5768, 2006 S. Industrial, Dallas, Texas

Drotz Mfg. Corp., 3841 W. Wisconsin Ave.,  
Milwaukee 8, Wis.

Drullard Co., Howard, 1026 Polson St., San  
Francisco 3, Calif.

Ducon Co., 152 E. 2nd St., Mineola, N.Y.

Duff-Norton Co. of Pittsburgh, Pa.

Du Mont Laboratories, Inc., Allen B., 750  
Blomfield Ave., Clifton, New Jersey

Dunkin Blue Print & Supply Co., Box 1400,  
Grand Junction, Colo.

duPont de Nemours & Co., E. I. Chemicals

Dept. duPont Blue, Wilmington, Del.

**DUPONT DE NEMOURS & CO. INC., EX-**

**PLOSIVES DIV.**, WILMINGTON 95,  
DELAWARE

DuPont de Nemours & Co., Inc., Fabric Div.,

Newburgh, N.Y.

**DUNHAM MFG. & SALES CO.**, GORDON S.,

853 MISSION ST., SO. PASADENA,  
CALIF.

Dunlop Rubber Co., Ltd., 10/12 King St. St.

James, London, S.W.1, England

Duriron Co., Inc., The, P.O. Box 1019, Day-

ton 1, Ohio

Dusterloh, G Fabrik fur Bergwerkbedarf

GmbH, Hauptstrasse 70, Sprockhovel

(Westf.) Germany

Dwight-Lloyd Div., McDowell Co., Inc., The

Dynamatic Div., Eaton Mfg. Co., 3307-14th

Ave., Kenosha, Wisconsin

## E

Eagle Crusher Co., Galion, Ohio  
Eagle Iron Works, 261 Holcomb Ave., Des  
Moines, Iowa

**EAKLAND & OSTERSTOCK**, 700 NEW-  
HOUSE BLDG., SALT LAKE CITY,  
UTAH

Earle, Norton K., 111½ N. Western Ave., Los  
Angeles 29, Calif.

Easton Car & Construction Co., Easton, Pa.

Eaton Manufacturing Co., Dynamic Div.,  
3307-14th Ave., Kenosha, Wisconsin

Eberhard Bauer GmbH, Esslingen Neckar,  
W. Germany

**EBERLINE INSTRUMENT CORP., P.O. BOX**

279, SANTA FE, NEW MEXICO

Economy Fuse & Mfg. Co., Greenview Ave.  
at Diversey Pkwy., Chicago, Ill.

Edison, Inc., Thomas A., Edison Storage Bat-  
tery Div., West Orange, N.J.

Edwards Co., E. H., P.O. Box 513, South San  
Francisco, Calif.

Edwards Co., Inc., Post Road, Norwalk, Conn.

Eickhoff, Gebr. Maschinenfabrik u. Eisenges-  
telle GmbH, Bochum, Germany

Elmco Corp., 634 S. 4th West St., Salt Lake  
City 10, Utah

Eisenhutte Prinz Rudolph, A.G., Dulman/  
Westf., Germany

Eisenwerke Mulheim/Meiderich A.G., (22a)  
Mulheim-Ruhr Postfach 420, Germany

Electric Controller & Mfg. Co., 4514 Lee  
Road, Cleveland 28, Ohio

Electric Machinery Mfg. Co., 800 Central Ave.,  
Minneapolis 13, Minn.

**ELECTRIC STEEL FOUNDRY CO.**, 2141 NW  
25TH AVE., PORTLAND 10, ORE.

Electric Storage Battery Co., Exide Industrial  
Division, 42 South 15th Street, Philadel-  
phia 2, Pa.

Electro Technical Lab. Div., Mandrel Indus-  
tries, 504 Waugh Dr., Houston, Texas

Elektromekanik A. S., 101 Park Ave., New York

17, N.Y.

**ELLIOT, D. H., P.O. BOX 1007, CASPER,**  
Wyo.

Eresco Corp., 2900 Corryway Ave., Cincinnati

25, Ohio

El Paso Testing Laboratories, El Paso, Tex.  
El-Tronics, Inc., Mayfield, Pa.  
Engineers Syndicate, Ltd., 5011 Hollywood  
Blvd., Hollywood 27, Calif.  
English Electric Export & Trading Co., Ltd.,  
Stafford, England  
Ensign-Bickford Co., Hopmeadow St., Simsbury, Conn.  
Enterprise Eng. & Mach Co., 18th & Florida  
St., S.F. 10, Calif.  
Equipment Engineering Co., 9100 S. 150 E.  
Sandy, Utah

**EQUIPMENT ENGINEERS INC.**, 41 SUTTER  
ST., SAN FRANCISCO 4, CALIF.

Erbo Maschinenbau, Erley & Bonninger, Bahnhofstrasse

268, Haslinghausen, Germany

Erie Pump & Engine Works, 155 Glenwood  
Ave., Medina, N.Y.

Erie Mfg. Co., 258 Magnet Drive, Erie, Pa.

Each-Werke K.G., Duisberg, West Germany

**ESCO INTERNATIONAL, GRAYBAR BLDG.**,

2519 Lexington Ave., NEW YORK 17,  
N.Y.

Essex Wire Corp., 1601 Wall Street, Fort  
Wayne 6, Ind.

Eso Standard Oil Co., 15 West 51st St.,  
New York 19, N.Y.

Esterline-Angus Co., Inc., P.O. Box 594,  
Indianapolis 6, Ind.

**EUCLID DIVISION**, SEE GENERAL  
MOTORS CORP.

Euclid Electric & Mfg. Co., 50 Edwards St.,  
Madison, Ohio

Eutectic Welding Alloys Corp., 40-40 172nd

St., Flushing 58, N.Y.

Exxon Co., The, Tonawanda, N.Y.

Exploration Drilling Co., P.O. Box 1161,  
Bakersfield, Calif.

## F

Fa. Ten Pas & Co., 140 Zeglis, Alkmaar,  
Netherlands

Fagersta AB, Fagersta, Sweden

Fagerstrøm Fabrikker, A/S, P.O. Box 22, Dram-

men, Norway

Falling Co., Geo. E., 424 E. Broadway, Enid,  
Oklahoma

Fairbanks Morse & Co., 600 S. Michigan Ave.,  
Chicago 5, Ill.

Fairchild Aerial Surveys, Inc., 224 E. 11th St.,  
Los Angeles, Calif.

Falk Corp., The, 3004 W. Canal St., Mil-  
waukee 1, Wis.

Farbwerke Hoechst AG., Frankfurt (M)-  
Hoechst, West Germany

Farrel-Birmingham Co., Inc., Ansonia, Conn.

Farris Flexible Valve Corp., 400 Commercial  
Ave., Palisades Park, N.J.

Farval Corp., The, 3249 E. 80th St., Cleve-  
land, Ohio

**FATE-ROOT-HEATH CO., THE PLYMOUTH  
LOCOMOTIVE WKS. DIV., PLYMOUTH,  
OHIO**

Federal Motor Truck Co., 5780 Federal Ave.,  
Detroit 9, Mich.

**FEDERAL PIPE & TANK CO.**, 6851 EAST

MARGINAL WAY, SEATTLE 8, WASH.

Filter Fabrics, Inc., 1279 W. 3rd St., Cleveland

13, Ohio

Filtration Engineers Div., American Machine

& Metals Inc., East Moline, Illinois

Firestone Tire & Rubber Co., 1200 Firestone

Pkwy., Akron 17, Ohio

Firth Sterling Inc., 3113 Forbes St., Pitts-  
burgh 30, Pa.

Fischer & Porter Co., 215 Warminster Rd.,  
Hathorpe, Pa.

Fisher Contracting Co., P.O. Box 6306,  
Phoenix, Ariz.

Fisher Research Laboratory, Inc., 1961 Uni-  
versity Ave., Palo Alto, Calif.

Fiske Brothers Refining Co., Lubriplate Div.,

129 Lockwood St., Newark 5, N.J.

Flexible Steel Lacing Co., 4607 Lexington St.,  
Chicago 11, Ill.

Flexible Tubing Corp., Guilford, Conn.

Flexible Valve Corp., 400 Commercial Ave.,  
Palisades Park, N.J.

Flottmann-Werke GmbH, Herne, Westf. West

Germany

Fluidwick Co., 5319 E. Outer Dr., Detroit 34,  
Mich.

Fluor Hartmann Div., Fluor Prods. Co., 1200

Washington Blvd., Whittier, Calif.

Food Machinery & Chem. Corp., John Bean

Div., P.O. Box 145, San Jose 3, Calif.

Fodens Ltd., Sandbach, Cheshire, England

Food Machinery & Chemical Corp., Peerless

Pump Div., 301 West Avenue 26, Los

Angeles, Calif.

Foster Engineering Co., 835 Lehigh Ave.,  
Union, N.J.

Foster Wheeler Corp., 165 Broadway, New

York 6, N.Y.

Four Wheel Drive Auto Co., 12th Street,  
Clintonville, Wis.

Foxboro Co., Foxboro, Mass.

Fraser & Chalmers Eng. Wks., Fraser Rd.,  
Erith, Kent, England

**FREDERICK, FRANCIS H.**, 699 MARKET

ST., SAN FRANCISCO 4, CALIF.

Frollich & Klupfel, Wuppertal-Barmen, W.

Germany

Fruehauf Trailer Co., 10940 Harper Ave.,  
Detroit 32, Mich.

## G

Galigher Co., 545 West 8th South St., P.O.

Box 299, Salt Lake City 10, Utah

Galion Allsteel Body Co., S. Market St.,  
Galion, Ohio

Gardner, E. D., 200 N. Wayne St., Arlington,  
Virginia

**GARDNER-DENVER CO.**, FRONT ST.,  
QUINCY, ILL.

Garlock Packing Co., Palmyra, New York

Gar Wood Industries, Inc., Wayne, Mich.

Gates Rubber Co., 999 S. Broadway, Denver,  
17, Colo.

Gatke Corp., 222 N. LaSalle St., Chicago 1, Ill.

General American Transportation Corp., 135

S. LaSalle St., Chicago 9, Ill.

General-American Valve Co., P.O. Box 444,  
Corona Del Mar, Calif.

General Aniline & Film Corp., Ozalid Div.,  
101 Anasco Road, Johnson City, N.Y.

**GENERAL CABLE CORP.**, 420 LEXINGTON

AVE., NEW YORK, N.Y.

General Detroit Corp., 110 Mt. Elliott, Detroit,  
Mich.

General Dynamics Corp., Electro Dynamic

Div., Avenue A, Bayonne, New Jersey

General Electric Co., Apparatus Sales Div., 1

River Rd., Schenectady 5, New York

General Electric Co., Plainville, Conn.

General Electric Co., Carboloy Dept., Box 237.

Roosevelt Park Place, Detroit 32, Mich.

General Electric Co., Construction Materials

Division, 1285 Boston Ave., Bridgeport 2,  
Conn.

**GENERAL ELECTRIC CO., INTERNATIONAL**

AL, 150 EAST 42ND ST., NEW YORK 17,  
N.Y.

General Electric Co., Lamp Dept., Nela Park,  
Cleveland 12, Ohio

General Electric Co., Metallurgical Products

Dept., 1117 E. 8 Mile Rd., Detroit 32,  
Mich.

General Electric Co. of England, Ltd., The

Fraser & Chalmers Eng. Works, Erith,

Kent, England

General Equipment Co., Box 134, Owatonna,  
Minnesota

General Fire Extinguisher Corp., 25631 Little

Mack St., Clair Shores, Mich.

**GENERAL HARDWOOD CO.**, MILWAUKEE

WATERWAY AT E. 11 ST., TACOMA,  
WASH.

General Machinery Co., 3500 Riverside Ave.,  
Spokane, Wash.

General Metals Corp., Enterprise Engine &

Machinery Co., 18th & Florida Streets,  
San Francisco 10, Calif.

General Mills, Inc., Chemical Div., Kankakee,  
Ill.

General Mills, Inc., Special Commodities Div.,  
400 Second Ave. South, Minneapolis 1,  
Minn.

General Motors Corp., Allison Div., P.O. Box

894, Indianapolis, Ind.

General Motors Corp., Deleo Products Div.,  
329 E. First St., Dayton, Ohio

General Motors Corp., Detroit Diesel Engine

Div., 13400 W. Otter Drive, Detroit 28,  
Mich.

General Motors Corp., Electro-Motive Div., La  
Grange, Ill.

**GENERAL MOTORS CORP., EUCLID DIV.**

1361 CHARDON RD., CLEVELAND 17,  
OHIO

General Motors Corp., GMC Truck & Coach

Div., 660 S. Blvd., E. Pontiac 11, Mich.

General Motors Corp., 269 N. Main St., New

Departure Div., Bristol, Conn.

**GENERAL MOTORS OVERSEAS OPERA-**

TION

1775 BROADWAY, NEW YORK

19, N.Y.

General Petroleum Corp., 612 S. Flower St.,  
Los Angeles, Calif.

General Refractories Co., 1520 Locust St.,  
Philadelphia 2, Pa.

General Tire & Rubber Co., Akron 1, Ohio

Geodynamics, Inc., 60 South Craig Ave., Pasadena,  
Calif.

Geo-Engr. 304 Main St., Grand Junction, Colo.

Geo-Optic Co., Inc., 170 Broadway, New York

38, N.Y.

Geophysical Services, Inc., 5900 Lemmon St.,  
Dallas 9, Texas

Geophysical Specialties Co., 4206 Longfellow

Ave., Minneapolis 7, Minn.

Geophysical Services, Inc., 65 E. 4th St.,  
S. Salt Lake City 11, Utah

Georgia Iron Works Co., 605-12th Street,  
Augusta, Ga.

Geellschaft für Werbeberatung und Wirtschafts-  
werbung MBH, Steinstrasse 27, Dusseldorf,  
Germany

**GETMAN BROS. MFG. DIV., INC., DUNKLEY AVE., SOUTH HAVEN, MICH.**  
Gibson, W. W., 1015 Fruitvale Ave., Oakland 1, Calif.  
Gilbreath Chemical Co., 283 Brannan St., San Francisco, Calif.  
**GODOY & CO., INC., E. A., CUNARD BLDG., 25 BROADWAY, NEW YORK 4, N.Y.**  
Goldak Co., 1544 W. Glenoaks Blvd., Glendale 1, Calif.  
**GOODALL BROS., BOX 537, 46 S. MAIN ST., HELENA, MONTANA**  
Goodall Rubber Co., 430 Whitehead Road, TRENTON, N.J.  
**GOODMAN MFG. CO., HALSTED ST. & 48TH PL., CHICAGO 9, ILL.**  
**GOODRICH CO., B. F., INTERNATIONAL INDUSTRIAL PROD. DIV., 500 S. MAIN ST., AKRON, OHIO**  
Goodyear Tire & Rubber Co., 1144 E. Market St., Akron, Ohio  
Gottwald, Leo, Werftstrasse, Dusseldorf, Germany  
**GOULD & CO., GORDON L., 58 SUTTER ST., SAN FRANCISCO 4, CALIF.**  
Gould-National Batteries, Inc., Trenton 7, New Jersey  
Granby Cons. Mining Smelting & Power Co., Ltd., Copper Mt., British Columbia, Canada  
**GRAYBAR ELECTRIC CO., INC., 420 LEXINGTON AVE., NEW YORK 17, N.Y.**  
**GREENSBURG MACHINE CO., STANTON ST., GREENSBURG, PA.**  
Gregg Co., Ltd., The 19 Rector St., New York 6, N.Y.  
Grinnell Co., Inc., 260 West Exchange St., Providence, R.I.  
Griphoist Inc., 424 Bryant St., S.F. 7, Calif.  
Gruendler Crusher & Pulverizer Co., 2917 N. Market St., St. Louis, Mo.  
Gulf Oil Corp.—Gulf Refining Co., 1822 Gulf Bldg., P.O. Box 1165, Pittsburgh 30, Pa.  
Gundlach Machine Co., Div., T. J., J. M. J. Industries, Inc., 226 Centerville Ave., Bellwood, Ill.  
Gurley, W. & L. E., 514 Fulton St., Troy, N.Y.  
Guston-Bacon Mfg. Co., 210 W. 10th St., Kansas City, Mo.  
Gutehoffnungshutte A.G., Oberhausen-Sterkrade, W. Germany

## H

**HACK ENGINEERING CO., 124 WAZEE MARKET, DENVER, COLO.**  
**HADFIELDS LTD., EAST HECLA WORKS, SHEFFIELD 9, ENGLAND**  
Haifa Mfg. Co., Inc., Geo., 250 5th Ave., N.Y. 1, N.Y.  
Hall-Scott Motors, Inc., 2850-7th St., Berkeley, Calif.  
Hammond Bag & Paper Co., Wellsbury, W.Va.  
Hankison Corp., College & Pike, Canonsburg, Pa.  
Hanks, Inc., Abbott A., 624 Sacramento St., San Francisco 11, Calif.  
**HANOVER INDUSTRIES, INC., 77 VETERAN ST., MERIDEN, CONN.**  
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.  
**HARDINGE CO., INC., 240 ARCH ST., YORK, PA.**  
HARNISCHFEGER CORP., 4400 W. NATIONAL AVE., MILWAUKEE 46, WIS.  
**HARNISCHFEGER EXPORT CORP., SEE HARNISCHFEGER CORP.**  
Harnischfeger Int'l Corp., GmbH, Alleenstrasse 33, Dusseldorf, Germany  
Hartmann, Maschinenfabrik, AG, Waldstrasse 220, Offenbach-Main, Germany  
Hasenclever, Maschinenfabrik, AG, Witzelstrasse 55, Dusseldorf, Germany  
Hausherr, Rudolf & Son, Maschinenfabrik, Alberfelderstrasse 53, Sprockhovel (Westf.) Germany  
Havlick, J. L., 112 S. Cedar St., Spokane, Wash.  
Hawley & Hawley, Box 1060, Douglas, Ariz.  
**HAWTHORNE, HERB J. INC., P.O. BOX 7366, HOUSTON 8, TEXAS**  
Haynes Stellite Co., Div. of Union Carbide Corp., 725 S. Lindsay St., Kokomo, Ind.  
Hazard Insulated Wire Wks., Okonite Co., Passaic, N.J.  
Hazen, H. L., H. L. Hazen, Inc., Farmers Union Bdg., Denver, Colo.  
Hazemag of Germany, P.O. Box 576, Munster (Westfalen), Germany  
Hazemag USA, Inc., 122 E. 42nd St., New York 17, N.Y.  
**HEAD WRIGHTSON, STOCKTON FORGE LTD., NORTON ROAD, STOCKTON-ON-TES, ENGLAND**  
Heil Co., 3009 W. Montana St., Milwaukee 1, Wis.  
Hemscheidt, Hermann, Maschinenfabrik, Bornberg 97-103, Wuppertal, W. Germany  
Hendrick Mfg. Co., Carbondale, Pa.  
Hensel Equip. Co., 800 Peralta Ave., San Leandro, Calif.  
Hercules Motors Corp., 101 11th St., S.E., Canton 2, Ohio

Hercules Powder Co., 900 Market St., Wilmington, Del.  
Hercules Steel Products Co., Sherman St., Gallon, Ohio  
Hevi Duty Electric Co., 4212 W. Highland Blvd., Milwaukee 1, Wis.  
**HEWITT-ROBINS INC., 666 GLENBROOK RD., STAMFORD, CONN.**  
Hewitt-Robins Inc., Hewitt Rubber Div., 240 Kensington Ave., Buffalo 5, N.Y.  
Hewitt-Robins Inc., Wire Products Plant, Henderson Rd. & Queen's Dr., King of Prussia, Pa. (Formerly: Korb Pettit, Inc.) Heyl & Patterson, Inc., 55 Fort Pitt Blvd., Pittsburgh 22, Pa.  
Hillman Co., C. Kirk, 3201 First Ave. South, Seattle 4, Wash.  
Hirsch Bros. Machy. Co., P.O. Box 226, El Paso, Tex.  
Hitchcock Mfg. Co., Leo, 12015 Wicks St., Sun Valley, Calif.  
Hobart Bros. Co., Hobart Sq., Troy, Ohio  
Hockensmith Corp., The Penn, Pennsylvania Hoffman Bros. Drilling Co., 120 E. Mahoning St., Punxsutawney, Pa.  
Holman Bros. (Canada) Ltd., Kent Ave., Kitchener, Ontario, Canada  
Holman Bros., Ltd., Camborne, Cornwall, England  
Holtzer-Cabot—see National Pneumatic Co., Inc.  
Homelite Div., Textron, Inc., Riverdale Ave., Port Chester, New York  
Home Mfg. Co., 142 East Pearl St., Lima, Ohio  
Hopkinson, Austin & Co., Ltd., Delta Works, Audenshaw, Manchester, England  
Hose Accessories Co., Le-Hi Div., 17th & Lehigh Ave., Philadelphia 32, Pa.  
Hose Accessories Co., Champ Industries Div., Lehigh Ave. & 17th St., Phila. 32, Pa.  
Hoosfeld Mfg. Co., 460-462 West Third St., Winona, Minn.  
Hough Co., The Frank G., 859 Sunnyside Ave., Libertyville, Ill.  
Houghton & Co., E. F., 303 W. Lehigh Ave., Philadelphia 33, Pa.  
Houston Tool Co., Santa Susana, Calif.  
Howe Scale Co., Inc., Rutland, Vermont  
Howell Electric Motors Co., 409 N. Roosevelt St., Howell, Mich.  
Huber Warco Co., 202 N. Greenwood St., Marion, Ohio  
Hudson, Robert, Ltd., Raeletrus House, Meadow Lane, Leeds 11, York, England  
Hughes Tool Co., P.O. Box 2539 Houston 1, Texas  
Hulin, Carlton D., 7 Ardiles Rd., Orinda, Calif.  
Humboldt, Klockner-Humboldt-Deutz A.G.—See Diesel Energy Corp., Cologne, Kalk, Western Germany  
**HUMPHREYS ENGINEERING CO., 910 FIRST NATIONAL BANK BLDG., DENVER 2, COLO.**  
Hunslet Engine Co., Ltd., The—125, Jack Lane Hunslet, Leeds 10, England  
Hunting Associates, Ltd., 1450 O'Connor Dr., Toronto 16, Ontario, Canada  
Huntington, Heberlein & Co., Ltd., Simon House, 28-29 Dover St., London, W.I., England  
Hycon Aerial Surveys, Inc., 1020 S. Arroyo Parkway, Pasadena, Calif.  
Hydraulic Supply Mfg. Co., 7600 8th Ave. So., Seattle, Wash.  
Hyster Co., 2002-80 N.E. Clackamas St., Portland 8, Oregon

**INTERNATIONAL GENERAL ELECTRIC CO., 570 Lexington Ave., New York 21, N.Y.**  
International Geophysic, Inc., 1063 Gayle Ave., Los Angeles, Calif.  
**INTERNAT'L HARVESTER CO., 180 N. MICHIGAN AVE., CHICAGO 1, ILL.**  
**INTERNAT'L HARVESTER EXPORT CO., 180 N. MICHIGAN AVE., CHICAGO 1, ILL.**  
**INTERNATIONAL MINERALS & METALS CORP., 11 BROADWAY, NEW YORK 4, N.Y.—SEE ORE BUYERS GUIDE, PG. 11**  
**INTERNAT'L SMELTING & REFINING CO., 515 KEARNS BLDG., SALT LAKE CITY, UTAH**  
Iowa Mfg. Co., Cedar Rapids, Iowa  
Iron Fireman Mfg. Co., 3170 W. 106th St., Cleveland 11, Ohio  
Irwin Foundry & Mine Car Co., P.O. Box 311, Irwin, Pa.  
**ISBELL CONSTRUCTION CO., P.O. BOX 2351, RENO, NEVADA**  
I-T-E Circuit Breaker Co., 19th & Hamilton Sts., Philadelphia 30, Pa.

## J

**JACUZZI BROS., INC., 5827 JACUZZI AVE., RICHMOND, CALIF.**  
Jaeger Machine Co., 667 Dublin Ave., Columbus, Ohio  
James Equipment, Inc., 712 Rockefeller St., Elizabeth, N.J.  
Jeffrey Mfg. Co., 861 N. 4th St., Columbus 16, Ohio  
Jet-Lube Inc., 7362 West Beverly Blvd., Los Angeles 36, Calif.  
Jet-Lube Inc., 3039 N. California St., Burbank, Calif.  
Johns-Manville Sales Corp., 22 East 40th St., New York 16, N.Y.  
Johnson, Consultant, Herbert B., 804 Franklin St., Clearwater, Fla.  
Johnson Block Co., Box 1432, 501 S. Rockford St., Tulsa, Okla.  
**JOHNSON, HERBERT BANKS, 804 FRANKLIN ST., CLEARWATER, FLA.**  
Johnson Loading Supplies, G. R., 5026 Butterworth Rd., Mercer Is., Wash.  
**JOHNSON MARSH CORP., 1724 CHESTNUT ST., PHILADELPHIA 3, PA.**  
Johnston Pump Co., 3272 E. Foothill, Pasadena, Calif.  
Jones, Philip L., 406 Miners Bank Bldg., Joplin, Mo.  
Jones & Laughlin Steel Corp., 8 Gateway Center, Pittsburgh 30, Pa.  
Joost Mfg. Co., 742 Bancroft Way, Berkeley, Calif.  
**JOY MFG. CO., HENRY W. OLIVER BLDG., PITTSBURGH 22, PA.**  
Junction Bit & Tool Co., P.O. Box 1951, Grand Junction, Colo.  
Justrite Mfg. Co., 2061 N. Southport, Chicago 14, Ill.

## K

**Kaelble, Carl GmbH, Backnang Nr. Stuttgart, W. Germany**  
Kaiser Aluminum & Chem. Corp., 1924 Broadway, Oakland 12, Calif.  
Kaiser Engineers, 1924 Broadway, Oakland 12, Calif.  
Kaiser Steel Corp., 1924 Broadway, Oakland, Calif.  
Ka-Mo Tools, Inc., 1845 So. 55 Ave., Cicero 50, Ill.  
Kane, Wm. G., Apartado 1061, Monterrey, N.L. Mexico, 1624 Milani Bldg., San Antonio, Texas  
Kato Engineering Co., 1415 First Ave., Mankato, Minn.  
Katolight Corp., 1st Ave. at Chestnut, Mankato, Minn.  
Kansas City Hay Press Co., 801 Woodsweather Road, Kansas City, Mo.  
Keegel, C. P., 1721 S. 14th St., Las Vegas, Nevada  
**KEENEY, PAUL E., CO., 1125 S. E. GRAND AVE., PORTLAND 14, ORE.**  
Kema, (Kohn-Ehrenfelder Maschinenbau-Austalt GmbH) Vogelsangerstr., 250, Kohn-Ehrenfeld, Germany  
**KENNAMETAL INC., MININGTOOL DIV., BEDFORD, PA.**  
**KENYER-VAN SAUN MFG. & ENG. CORP., TWO PARK AVE., NEW YORK 16, N.Y.**  
**KENWORTH MOTOR TRUCK COMPANY, 8801 E. MARGINAL WAY, P.O. BOX 3505, SEATTLE, WASH.**  
Kern Instruments, Inc., 120 Grand St., White Plains, N.Y.  
Keuffel & Esser Co., 300 Adams St., Hoboken, N.J.

Keystone Lubricating Co., 21st & Lippcott Sts., Philadelphia 32, Pa.  
 Kidde, Walter & Co., Inc., 456 Main St., Belleville 9, N.J.  
 King Powder Co., The, P.O. Box 974, Cincinnati, Ohio  
 Klein, Schanzlin & Becker, Stuttgart, Germany  
 Klockner-Humboldt-Deutz Ag., Köln, Germany  
 Knapp & Bates, Ltd., Africa House, Kingsway, London W.C.2, England  
**KNAPPSACK-GRIESHEIM, A.G. (SEE FARBWERKE HOESCHT)**  
 Koehel Diamond Tool Co., 9456 Grinnell Ave., Detroit 13, Mich.  
**KOEHRING CO., 3026 WEST CONCORDIA AVE., MILWAUKEE 16, WIS.**  
 Koehring Southern Co., Manufactures Rd., Chattanooga 1, Tenn.  
 Kohler Co., Kohler, Wis.  
 Koppers Co., Wood Pres. Div., 700 Koppers Bldg., Pittsburgh, Pa.  
 Koppers Co., Inc., Wolman Dept., 700 Koppers Bldg., Pittsburgh, Pa.  
 Kroly Plastic Pipe Co., Inc., 4720 E. Washington Blvd., Los Angeles 22, Calif.  
 Krebs, Kellogg, 564 Market St., San Francisco 4, Calif.  
 Krogh Pump & Equipment Co., 515 Harrison St., San Francisco, Calif.  
 Krupp, Fried, Maschinen un Stahlbau, Rheinhausen, W. Germany  
 Kuhlm Electric Co., Box 289, Birmingham, Michigan  
 KW-Dart Co., 2623 Oak St., Kansas City 8, Mo.

## L

LaBour Co., 1607 Sterling Ave., Elkhart, Ind.  
**LAKE SHORE INC., LAKE SHORE ENG. DIV., BOX 911, IRON MTN., MICH.**  
 Lancashire Dynamo & Crypto Ltd., Trafford Park, Manchester 17, England  
 Landis Steel Co., Box 248, 116 West A St., Picher, Okla.  
 LaRoe Instruments, Inc., 1709 B. Rockville Pike, Rockville, Maryland  
 Laughlin Co., Thomas, 143 Fore St., Portland 6, Maine  
 Laylander, Philip A., Box 25, Sierra Madre, Calif.  
 Lead Lined Iron Pipe Co., 33 Broadway, Wakefield, Mass.  
**LECTROHEMELT FURNACE CO., PITTSBURGH, PA.**  
**LEDEEN MFG. CO., 2338 N. GILMAN RD., EL MONTE, CALIF.**  
 Ledoux & Sonn, 859 Alfred Ave., Teaneck, N.J.  
 Leeds & Northrup Co., 4970 Stanton Ave., Phila. 44, Pa.  
 Lee Rubber & Tire Corp., Republic Rubber Div., 1410 Albert St., Youngstown, Ohio  
 Lefax, Ninth & Sansom Sts., Phila. 7, Pa.  
 Lehigh Safety Shoe Co., First & Minor Sts., Emmaus, Pa.  
 Leonard Electric Mfg. Co., 3907 Perkins Ave., Cleveland 14, Ohio  
 Lerlab Supply Co., P.O. Box 810, Hibbing, Minn.  
 Lerch Bros. Inc., P.O. Box 810, Hibbing, Minn.  
 Leroi Div., Westinghouse Airbrake Co., 3716 W. Wisconsin Ave., Milwaukee, Wis.  
 Leschen Wire Prod. Div., H. K. Porter Co., 2727 Hamilton Ave., St. Louis 12, Mo.  
**LETOURNEAU-WESTINGHOUSE CO., 2301 N. ADAMS ST., PEORIA, ILL.**  
 Libe Shovel Co. AB, Sturevagen 18, Stockholm, Sweden  
 Lima Electric Motor Co., Findlay Road, Lima, Ohio  
**LINATEX CORP. OF AMERICA, VERNON AVE., ROCKVILLE, CONNECTICUT**  
 Lincoln Electric Co., 22801 St. Clair Ave., Cleveland 17, Ohio  
 Linde Air Products Co., 30 E. 42nd St., New York 17, N.Y.  
**LINK-BELT CO., PRUDENTIAL PLAZA, DEPT. WMD-57, CHICAGO, ILL.**  
 Link-Belt Speeder Corp., 1201 Sixth St., S.W., Cedar Rapids, Iowa  
 Lintz, Mark 275 Middlefield Dr., San Francisco 27, Calif.  
 Lippmann Engineering Works, 4603 W. Mitchell St., Milwaukee 14, Wis.  
 Liquid-Solid Separations Ltd., 2 Anderson St., London, S.W.3, England  
 Lister-Blackstone, Inc., 42-32 21st St., Long Island City 1, N.Y.  
**LIVE ROLLER MILLS MFG. CO., 476 E. TWAIN, FRESNO 26, CALIF.**  
 LIVINGSTON & WILSON EXPLORATION & DRILLING CO., LONGMONT, COLO.  
 Loesche, Hartzerkleinerungs-u. Zementmaschinen K.G. Steinstrasse 18—Dusseldorf, W. Germany  
 Locomotive Crane Div., McDowell Co., Inc., The  
**LOGAN ENGR. CO., 4901 WEST LAWRENCE AVE., CHICAGO 30, ILL.**  
 LONGYEAR CO., E. J. 1700 FOSHAY TOWER, MINNEAPOLIS 2, MINN.  
 LOOFBOUROW, R. L. 4032 QUEEN AVE. SO., MINNEAPOLIS 10, MINN.  
 Los Angeles Scientific Instrument Co., 2451 Riverside Drive, Los Angeles 39, Calif.

Lowell Insulated Wire Corp., P.O. Box 571, Pawtucket, R.I.  
 Ludlow-Saylar Wire Cloth Co., 634 South Newstead Ave., St. Louis 10, Mo.  
 Lufkin Rule Co., Saginaw, Mich.  
 Lug-All Co., 358 E. Lancaster, Haverford, Pa.  
 Lundberg Exploration, Ltd., 96 Eglinton Ave. E., Toronto 12, Ontario, Canada  
 Lunkenhimer Co., Beckman St. & Waverly Ave., Cincinnati 14, Ohio  
 Lurgi-Ges. f. Chemie & Huettewesen m.b.H., Lurgihaus, Gervinusstrasse, Frankfurt 14, Germany  
 Lynn Engr. Co., Russ Building, San Francisco 4, Calif.

## M

M-H Standard Corp., 515 Communipaw Ave., Jersey City 4, N.J.  
 MRS Mfg. Co., Jackson, Miss.  
 MacAftee & Co., 3108 Wilshire Blvd., Los Angeles 5, Calif.  
 MacBeth Instrument Corp., P.O. Box 950, Newburgh, N.Y.  
**MACE CO., THE, 2763 BLAKE STS., DENVER 5, COLO.**  
 MacP Petrol. Bldg., 509, Denver 2, Colo.  
**MACK TRUCKS, INC., EMPIRE STATE BLDG., NEW YORK 1, N.Y.**  
 MacMillan Petroleum Corp., 530 W. Sixth St., Los Angeles 14, Calif.  
 MacWhyte Co., 2998 14th Ave., Kenosha, Wis.  
 Maddox Foundry & Machinery Works, Archer, Fla.  
**MAGMA COPPER CO., SUPERIOR, ARIZONA**  
 Magnetic Engineering & Mfg. Co., 851 Van Houten Ave., Clifton, N.J.  
 Magar Car Corp., 50 Church St., New York 7, N.Y.  
**MAHOGANY IMPORTING CO., 725 S. SPRING ST., LOS ANGELES 14, CALIF.**  
 Majac Inc., 23rd St. & P.R.R., Sharsburg 15, Pa.  
 Mancha Storage Battery Locomotive Div., Goodman Mfg. Co., Halsted & 48th Pl., Chicago 9, Ill.  
 Manchester Bit Corp., 11 Broadway, N.Y. 4, N.Y.  
**MANITOWOC ENGINEERING CORP. SOUTH 16TH ST., MANITOWOC, WIS.**  
 Mannesmann Export G.m.b.H., Thomasstrasse 6, Dusseldorf, Germany  
**MANNING CO., CHAS. L., 4700 CLAIRTON BLVD., PITTSBURGH 36, PA.**  
**MARION POWER SHOVEL CO., 617 W. CENTER ST., MARION, OHIO**  
 Markley Dust Control System, Inc., 80 Snyder Road, Ramsey, N.J.  
 Marlin-Rockwell Corp., 400 Chandler St., Jamestown, N.Y.  
 Marlow Pump Div., Bell & Gossett Co., Box 200 Midland Park, N.J.  
 Marmon-Herrington Co., Inc., 1511 W. Washington St., Indianapolis 7, Ind.  
 Martindale Electric Co., 1332 Hird Ave., Cleveland 7, Ohio  
 Maschinenfabrik Augsburg-Nurnberg AG. (M.A.N.) Nurnberg, West Germany  
 Master Electric Co., 126 Davis Ave., Dayton 1, Ohio  
 Mather & Platt Ltd. Park Works, Manchester 10, England  
 Matheson Co., Inc., Richard St. & Manhattan Rd., Joliet, Ill.  
 Matheson Co., Inc., 327 Paterson Plank Rd., P.O. Box 85, East Rutherford, N.J.  
 Mavor & Coulson Ltd., Bridgeton Glasgow S.E. Scotland  
 Mayhew Supply Co., 4700 Scyene Rd., Dallas, Texas  
**MAYO TUNNEL & MINE EQUIP., BOX 1413, LANCASTER, PA.**  
 McCauley Industrial Corp., 1840 Howell Ave., Dayton, Ohio  
 McClintoch Co., R. S., W. 418-2nd Ave., Spokane, Wash.  
 McDonald, T. J., 14408 St. Marys, Detroit 27, Mich.  
 McDowell Co., Inc., The, 3203 W. 71st St., Cleveland 2, Ohio  
 McKenzie & Whittle Cont., P.O. Box 5602, Dallas, Texas  
**MCLANAHAN & STONE CORP., HOLLIDAYSBURG, PA.**  
**MCMILLAN, W. D., 1009 GRANT ST., APT. 9, DENVER 3, COLO.**  
 McNally Pittsburgh Mfg. Corp., Drawer D, 307 W. 3rd St., Pittsburgh, Kansas  
 Meissner Engr. Inc., John F., 308 W. Washington, Chicago 6, Ill.  
 Menardi & Co., 1222 E. Grand Ave., El Segundo, Calif.  
 Mench & Hamrock GmbH, Hamburg-Altona, Germany  
 Menlo Research Lab., Box 522, Menlo Park, Calif.  
 Merck & Co., Lincoln Ave., Rahway, N.J.  
**MERRICK SCALE MFG. CO., 180 AUTUMN ST., PASSAIC, N.J.**  
 Merton Engineering Co. Ltd., Faggs Road, Felt-ham Middx., England  
 Metal Carbides Corp., 6001 Southern Blvd., Youngstown, Ohio  
 Metron Instrument Co., 432 Lincoln St., Denver, Colo.

Metropolitan-Vickers Electrical Co., Ltd., Mosley Rd., Trafford Park, Manchester 17, England  
 Mexico Refractories Co., Mexico, Mo.  
 Michigan Pipe Co., 6581 Mill St., Gagetown, Bay, Mich.  
 Michigan Tool Co., Manistee Iron Works, Manistee, Mich.  
 Miehle-Goss-Dexter, Inc., Star-Kimble Motor Div., 209 Bloomfield Ave., Bloomfield, N.J.  
 Micro Switch Div. of Minneapolis-Honeywell Regulator Co., Chicago & Spring Sts., Franklin, Ill.  
 Mill & Mine Supply, Inc., 505 Lander St., Seattle 4, Wash.  
 Miller Machinery Co., Box 1496, Missoula, Montana  
 Mills Iron Works, Inc., 929 North Main St., Los Angeles 12, Calif.  
 Minerals Et Metaux, Societe Anonyme, 28 Rue Arthur Rozier, Paria XIX, France  
 Minerals Engineering Co., 417 S. Hill St., Los Angeles 13, Calif.  
 Minerals Engr. Co., P.O. Box 1951, 804-4th Ave., Grand Junction, Colorado  
 Minerals Exploration Research Corp., 2120 Ford St., Golden, Colo.  
 Minerals Laboratory, 1303 Grant St., Silver City, New Mexico  
 Minerco Corp., 120 Broadway, New York, N.Y.  
**MINE SAFETY APPLIANCES CO., 201 N. BRADDOCK AVE., PITTSBURGH 8, PA.**  
**MINE & SMELTER SUPPLY CO., 1422-17TH ST., DENVER, COLO.**  
**MINERS FOUNDRY & MFG. CO., 200 SPRING ST., NEVADA CITY, CALIF.**  
 Mining & Geophysical Services, Ltd., 123 Victoria St., London S.W.1, England  
 Minneapolis-Honeywell, Heiland Div., 130 E. 5th St., Denver 3, Colo.  
 Minneapolis-Honeywell Regulator Co., Industrial Div., Wayne & Windrim Avenues, Philadelphia 44, Pa.  
 Minneapolis-Moline Co., P.O. Box 1050, Minneapolis 1, Minn.  
 Minnesota Mng. & Mfg. Co., Irvington Varnish & Insulator Div., 6 Argyle Terrace, Irvington 11, N.J.  
**MIRRLEES, BICKERTON & DAY LTD., MIRRLEES WORKS, HAZEL GROVE, STOCKPORT CHESHIRE, ENGLAND**  
 Mitchell Mfg. Co., 101 Sherman Ave., New York 34, N.Y.  
 Mixermobile Mfg. Inc., 8027 N.E. Killingsworth, Portland 20, Ore.  
 Moab Drilling Co., 62 E. Center St., Box 487, Moab, Utah  
 Mobile Drilling, Inc., 960 North Pennsylvania St., Indianapolis 4, Ind.  
 Monet Industries Inc., 65-75 E. 23rd St., P.O. Box 1786, Paterson 17, N.J.  
 Monarch Equipment Co., 6585 Lankershim Blvd., N. Hollywood, Calif.  
 Monsanto Chemical Co., 1700 S. Second St., St. Louis 4, Mo.  
 Morgardshammar Mek. Verkstads AB, Morgardshammar, Sweden  
 Morris Machine Works, Baldwinsville, N.Y.  
**MORSE BROS., MACHINERY CO., 2900 BRIGHTON BLVD., DENVER, COLO.**  
 Morse Chain Co., Ithaca, N.Y.  
 Mosbach Electric & Supply Co., 1115 Arlington Ave., Pittsburgh 3, Pa.  
 Motor Generator Corp., W. Water St., Troy, Ohio  
**MOTOR RAIL, LTD., SIMPLEX WORKS, BEDFORD, ENGLAND**  
 Motorola Communication & Electronics, Inc., 4501 W. Augusta Blvd., Chicago 51, Ill.  
 Mott & Sons, Inc., B. H., Grand Junction, Colo.  
 Mott Core Drilling Co., Mott Bldg., Box 2076, Huntington, W. Va.  
 Murphy, F. M., Consulting Geol., 1201 Maryland Parkway, Las Vegas, Nev.

## N

**NAGLE PUMPS, INC., 1250 CENTER AVE., CHICAGO HEIGHTS, HARVEY, ILL.**  
 Napco Industries Inc., 834 N. Seventh St., Minneapolis 11, Minn.  
 National Airoil Burner Co., 1284 E. Sedgley Ave., Philadelphia 34, Pa.  
 National Carbon Co., 60 E. 42nd St., N.Y. 17, N.Y.  
 National First Aid Supply Co., 28 W. 15th St., N.Y. 11, N.Y.  
 National Filter Media Corp., 1717 Dixwell Ave., New Haven 14, Conn.  
 National Fuse & Powder Co., 3801 Delaney St., Denver 5, Colorado  
**NATIONAL IRON CO., 50TH AVE. & RAMSEY ST., DULUTH 7, MINN.**  
**NATIONAL MALLEABLE & STEEL CASTINGS CO., 10600 QUINCY AVE., CLEVELAND 6, OHIO**  
 National Mine Service Co., 564 Aleo Bldg., Pittsburgh 19, Pennsylvania  
 National Supply Co., 2 Gateway Center, Pittsburgh 22, Pa.  
**NATIONAL TANK & PIPE CO., 2301 N. COLUMBIA BLVD., PORTLAND 17, ORE.**  
**NAYLOR PIPE CO., 1242 E. 92ND ST., CHICAGO 19, ILL.**

New Jersey Meter Co., 120 Waynewood Park, Plainfield, New Jersey  
 New York Air Brake Co., The Aurora Pump Div., 86 Loucks St., Aurora, Ill.  
 New York-Arizona Development Corp., 614 Mayer-Heard Bldg., Phoenix, Ariz.  
 New York Engineering Company, 75 West St., N.Y.C., N.Y.  
 Newark Industries Co., Div. of Heyden-Newport Chemical Corp., 342 Madison Ave., Newark 12, N.Y.  
 Newton, Chambers & Co., Ltd., Thorncliffe, N.Y., Sheffield, England  
 Nice Ball Bearing Co., 30th & Hunting Park Ave., Philadelphia 40, Pa.  
 Nichols Engineering & Research Corp., 70 Pine St., New York 5, N.Y.  
 Nola Co., Bowerston, Ohio  
**NORDBERG MFG. CO.**, 3073 S. CHASE AVE., MILWAUKEE 1, WIS.  
 North American Refractories Co., 1012 Nat'l. City-E 6th St. Bldg., Cleveland 14, Ohio  
**NORTHERN BLOWER CO.**, 6429 BARBERTON AVE., CLEVELAND 2, OHIO  
 Northwest Engr. Co., 135 S. LaSalle St., Chicago 3, Ill.  
 Norton Co., 1 New Bond St., Worcester 6, Mass.  
 Norwood Controls Unit, Detroit Controls Div. of American Standard, 934 Washington St., Norwood, Mass.  
 Nuclear-Chicago Corp., 223 W. Erie St., Chicago 10, Ill.  
 Nucleonic Corp. of America, 196 Degraw St., Brooklyn 31, N.Y.

O'Donnell & Schmidt, 165 Broadway, New York 6, N.Y.  
 Ogden Iron Works Co., 185-23rd St., Box 147, Ogden, Utah  
 Ohio Brass Co., 380 North Main St., Mansfield, Ohio  
 Ohio Carbon Co., 12508 Berea Rd., Cleveland 11, Ohio  
 Ohio Electric Mfg. Co., 5900 Maurice Ave., Cleveland 27, Ohio  
 Ohio Gear Co., 1333 E. 179th St., Cleveland 10, Ohio  
 Ohio Hoist & Mfg. Co., 18111 Shaker Sq., Dept. M.W., Cleveland 20, Ohio  
 Ohio Locomotive Crane Co., Bucyrus, Ohio  
**OIL TOOL MFG. CO.**, BOX 712 TONAWA, OKLA.  
 O'Keefe, John J., 822 E. Compton Blvd., Compton, Calif.  
 Okonite Co., Hazard Insulated Wire Works Div., 220 Faasai St., N.J.  
 Olin Mathison Chem. Corp., Explosives Div., East Alton, Ill.  
 Oliver Corp., 400 W. Madison St., Chicago 6, Ill.  
 Oliver Corp., A. B. Farquaar Div., 142 N. Duke St., York, Pa.  
 Onan Sons, Inc., D. W., 2515 University Ave., S.E., Minneapolis 14, Minn.  
 Ore & Chemical Co., 80 Broad St., New York, N.Y.  
 Ore Research & Laboratories, 1511 Levee St., Dallas, Texas  
 Ore Trucks, Inc., 320 South Grand St., St. Louis, Mo.  
 Orenstein-Koppel und Lubecker Maschinenbau AG, Postfach 270, Lubeck, Germany  
 Osborne Lab. Inc., Raymond G., 235 W. 27th, Los Angeles 7, Calif.  
 Osmose Wood Preserving Co. of America Inc., 980 Ellicott St., Buffalo 9, N.Y.  
 Overstrom & Sons, 2213 W. Mission Rd., Alhambra, Calif.  
 Owen Bucket Co., The, 6001 Breakwater Ave., Cleveland 2, Ohio  
 Oxy-Catalyst, Inc., P. O. Box 151, Wayne, Pa.

**P**  
 Pacific Car & Foundry Co., 4th & Factory, Renton, Wash.  
 Pacific Coast Engr. Co., Oak & Cement St., P.O. Drawer "E", Alameda 6, Calif.  
**PACIFIC FOUNDRY CO., LTD.**, 3100 19TH ST., SAN FRANCISCO 10, CALIF.  
 Pacific Gear & Tool Works, Inc., 1035 Folsom St., San Francisco 3, Calif.  
 Pacific Pipe Co., 401 Folsom St., San Francisco, Calif.  
 Pacific Wire Rope Co., 1840 E. 15th St., Los Angeles 21, Calif.  
 Pacific Wood Tank Corp., 461 Market St., San Francisco 5, Calif.  
 Pack Mfg. Co., 55 West 1st North, Logan, Utah  
 Page Engineering Co., Clearing Post Office, Chicago 38, Ill.  
 Paratitan Wire & Cable, Div. Essex Wire Corp., 1601 Wall St., Ft. Wayne, Ind.  
 Parker Ltd., Frederick, Viaduct Works, Leicester Leicestershire, England  
 Parker Safety Equip. Co., 785 Lyons Ave., Irvington 11, N.J.

Peale, Rogers, 315 Montgomery St., San Francisco, Calif.  
 Peerless Pump Div., Food Machinery & Chemical Corp., 301 W. Ave. 26, Los Angeles 31, Calif.  
 Pegasus, Ltd., Coalville, Leicestershire, England  
 Penn Assoc., Central No. 29 Angostura, Sinaloa, Mexico

Pence & Co., Inc., Earl H., 2150 Washington Ave., San Leandro, Calif.  
 Pendleton Woolen Mills, P.O. Box 275, Washougal, Wash.

Penn Instrument Div., Burgess Manning Co., 4110 Haverford Ave., Philadelphia, Pa.  
 Pennsalt Chemicals Corp., 8 Penn Center, Phila. 2, Pa.

Pennsylvania Crusher Div., Bath Iron Works Corp., 323 S. Matlack St., West Chester, Pa.

Pennsylvania Drilling Co., 1205 Chartiers Ave., Pittsburgh 20, Pa.

Permo Exploration Co., Box 401, Nye, Montana  
 Permutit Co., The, 330 W. 42nd St., New York, N.Y.

Peterson Filters & Engr. Co., 137 Social Hall Ave., Salt Lake City, Utah

Pettibone Mulliken Corp., 4710 W. Division St., Chicago 51, Ill.

Phelps Dodge Refining Corp., 40 Wall St., New York 5, N.Y.

Phelps Dodge Copper Prod. Corp., 300 Park Ave., New York, N.Y.

Philadelphia Gear Works, Inc., G-St. below Erie Ave. & G. St., Philadelphia 34, Pa.

Philadelphia Quartz Co., 1146 Public Ledger Bldg., Philadelphia 6, Pa.

Philip Carey Mfg. Co., Wayne Ave. at Cooper, Cincinnati, Ohio

Photovolt Corp., 95 Madison Ave., N.Y. 16.

Pick Laboratories, P.O. Box 67, Saratoga, Calif.

**PIGGOTT PROJECTS**, 1857 HOWARD ST., SAN FRANCISCO, CALIF.

Philips Electronics, Inc., Instruments Div., 750 South Fulton Ave., Mt. Vernon, N.Y.

Pierce, Roger V., 808 Newhouse Bldg., Salt Lake City 4, Utah

Pioneer Engineering Div., Poor & Co., Inc., 3200 Como Ave., Minneapolis, Minn.

Pitman Manufacturing Co., 300 W. 79th Terrace, Kansas City, Mo.

Plastic Tamping Stick Sales, P.O. Box 49,

R.R. 3, Iron River, Michigan

**PLYMOUTH LOCOMOTIVE WORKS, DIV. OF THE FATE-ROOT-HEATH CO., PLYMOUTH, OHIO**

Plueger, Underwasserpumpen GMBH, Hamburg-Wandsbek Friedrich-Ebert-Damm 101, Germany

Pohlbg. J. (AG), Pohlstr. 1, Kolin-Zollstock, West Germany

Pollock Co., Wm. B., 101 Andrews Ave., Youngstown, Ohio

Polysius G.m.b.H., Graf-Galenstr. 17, Neu-Isenburg, West Germany

Porter, Inc., H. K., 74 Foley St., Somerville 18, Mass.

Porter Co., Inc., H. K., Lescon Wire Rope Div., 2727 Hamilton Ave., St. Louis, Mo.

Porter Co., Inc., H. K., Quaker Rubber Div., Tacony & Conmy Streets, Philadelphia, Pa.

Porter Co., Inc., H. K., W-S Fittings Div., 108 Aldene Road, P.O. Box 95, Roselle, N.J.

Portland Woolen Mills, Inc., P.O. Box 2620, Portland 3, Ore.

Porto Tool Co., 8103 Santa Monica Blvd., Santa Monica, Calif.

Post Co., Frederick, 155 E. Ohio, Chicago, Ill.

Powermite Drill & Tool Co., 1610½ N. High

land, Box 691, Hollywood, Calif.

Precision Radiation Instruments Inc., 4223 W.

Jefferson Blvd., Los Angeles 16, Calif.

Premag, G.m.b.H., Geisenheim (Rhein) Germany

Price, Franklin L. C., 1105 Northern Life Tower, Seattle 1, Wash.

Princeton, Giphophil Inc., 32 George St., Boston 19, Mass.

**PRODUCTIVE EQUIPMENT CORP.**, 2926 W. LAKE ST., CHICAGO 12, ILL.

**PROGRESSIVE COLOR & CHEMICAL CO., INC.**, 350 FIFTH AVE., NEW YORK, N.Y.

Pulmosan Safety Equip. Corp., 644 Pacific St., Brooklyn 17, N.Y.

Pulva Corp., 604 High St., Perth Amboy, N.J.

Pumps, Inc., 323 W. 10th St., Indianapolis 7, Indiana

Punch-Lok Co., 321 N. Justine St., Chicago 7, Ill.

Pyrene C-O-Two Div., Fyr-Fyter Co., The, P.O. Box 750, Newark 1, N.J.

Pyrometer Instrument Co., Inc., 92 Portland Ave., Bergenfield, N.J.

Quaker Rubber Div., H. K. Porter Co., Tacony & County Sta., Phila. 24, Pa.  
 Quick-Way Truck Shovel Co., 2401 E. 40th Ave., Box 1800, Denver, Colo.

**R**

Radia Co., Inc., 429 5th Ave., New York 17, N.Y.

Ramsey Axle Div., American Brake Shoe Co., 332 S. Michigan Ave., Chicago 4, Ill.

**RANKIN MFG. CO.**, 616 S. MARENGO AVE., ALHAMBRA, CALIF.

Rapid Magnetic Machines, Ltd., Lombard St., Birmingham 12, England

Rawson Electrical Instrument Co., 110 Potter St., Cambridge 42, Mass.

Raybestos-Manhattan, Inc., 61 Willett St., Passaic, N.J.

Ray Drilling Co., Inc., 343 S. State, Salt Lake City, Utah

Ray-O-Vac Co., 212 E. Washington Ave., Madison 10, Wis.

Ray-O-Vac Co., Willson Products Div., 2nd & Washington St., Reading, Pa.

Ready Power Co., 11231 Freud Ave., Detroit 14, Mich.

**REED ENGINEERING CO.**, 620 SO. INGLEWOOD AVE., INGLEWOOD, CALIF.

Reeves Pulley Co., 1225-7th St., Columbus, Ind.

Reich Bros. Mfg. Co., 1439 Ash St., Terre Haute, Ind.

Reilly Tar & Chemical Corp., 1615 Merchants Bank Building, Indianapolis 4, Ind.

Reliance Electric & Engineering Co., 24701 Euclid Ave., Cleveland 17, Ohio

Remington Arms Co., Inc., 939 Barnum Ave., Bridgeport 2, Conn.

Republic Rubber Div., Lee Rubber & Tire Corp., Albert St., Youngstown, Ohio

Republic Steel Corp., Republic Bldg., Cleveland 1, Ohio

Republic Steel Corp., Bolt & Chain Div., 1970 Cedar Rd., Cleveland, Ohio

Republic Steel Corp., Truscon Steel Div., Albert St., Youngstown 1, Ohio

Research Control, Inc., P.O. Box 750, Bound Brook, N.J.

Research Inc., 1511 Lence St., P.O. Box 10243, Dallas, Texas

Resisto-Loy Co., Inc., 1251 Phillips Ave., S.W., Grand Rapids 7, Mich.

Revere Copper & Brass Inc., 230 Park Ave., New York 17, N.Y.

Revere Electric Mfg. Co., 6009 Broadway, Chicago 40, Ill.

Rhoads & Son, J. E., 2100 W. 11th St., Wilmington 99, Del.

**RIBLET TRAMWAY CO.**, N. 1231 WASHINGTON ST., SPOKANE, WASH.

Rice Pump & Mach. Co., Belgium, Wisc.

Richardson Scale Co., 688 Van Houten Ave., Clifton, N.J.

Rick Helicopter, San Francisco International Airport, San Francisco, Calif.

Rip-Bits, Ltd., Callywhite Lane, Dronfield, Sheffield, England

Robbins & Myers, Inc., 1345 Lagonda Ave., Springfield, Ohio

Roberts & Schaefer Co., 130 N. Wells St., Chicago 6, Ill.

Robertshaw-Fulton Controls Co., 2920 N. 4th St., Philadelphia 33, Pa.

Robinson Clay Product Co., The, 65 W. State St., Akron 9, Ohio

Rockwell Mfg. Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.

Rocky Mtn. Instrument Co., 1410-16th St., Denver, Colo.

Rodale Mfg. Co. Inc., Emmaus, Pa.

Roden-Blackburn Int'l. Corp., 149 Broadway, N.Y., N.Y.

**ROBLING'S SONS CORP., JOHN A.**, 640 S. BROAD ST., TRENTON 2, N.J.

Rogers Brothers Corp., Albion, Pa.

Roger Bros. Works Co., Joplin, Mo.

Rohm & Haas Co., Washington Square, Philadelphia, Pa.

Roller Bearing Co. of America, Sullivan Way, West Trenton, N.J.

Rollway Bearing Co., Inc., 541 Seymour St., Syracuse, N.Y.

Rome Cable Corp., Ridge 56, P.O. Box 71, Rome, N.Y.

Root & Simpson, Inc., 1310 E. 17th Ave., Denver 18, Colo.

Roots-Conversville Blower Div., Dresser Industries, 900 W. Mount St., Conversville, Ind.

Rose Mfg. Co., 2700 West Barberry Place, Denver, Colo.

**ROSS SCREEN & FEEDER CO.**, 100 QUIMBY ST., WESTFIELD, N.J.

Rothe Erde Eisenwerk G.m.b.H., Dortmund, Germany

Rotolite Corp., Essex St., Stirling, N.J.

Round Chain Co.'s, Broadway & Chaincraft Rd., Cleveland 5, Ohio

Rowan Controller Co., 2313 Homewood Ave., Baltimore 18, Md.

Ruhrkunst G.m.b.H., Mulheim-Ruhr, West Germany

Ruston & Hornsby, Ltd., Lincoln, England

**Q**

Quaker Pioneer Rubber Mills, 520 Fourth St., San Francisco, Calif.

Ruston-Bucyrus, Ltd., Lincoln, England  
Ruth Co., The, 1437 Blake St., Denver 2, Colo.  
Ryerson, Joseph T. & Son, Inc., 2558 W. 16th  
St., Chicago 8, Ill.

## S

Safety Clothing & Equip. Co., 1990 E. 69  
St., Cleveland, Ohio  
Safety Fire Extinguisher Co., 293 Seventh St.,  
N.Y. 1, N.Y.  
Safety First Supply Co., 425 Magee St.,  
Pittsburgh 19, Pa.  
Salem Oil Co., 25 E. Main St., DuQuoin, Ill.  
Salem Tool Co., 767 S. Ellsworth Ave., Salem,  
Ohio  
Salzgitter, Salzgitter-Bad, Germany  
Sanford-Day Iron Works Inc., Dale Ave., Box  
1511, Knottsville, Tenn.  
Santa Fe Tank Div., Floor Products Co., P.O.  
Box 510, Whittier, Calif.  
Saracco Tank & Welding Co., 141 S. Maple  
Ave., So. San Francisco, Calif.  
Sarcos & Sarcotherm Controls Inc., 635 Madison  
Ave., New York 22, N.Y.  
**SAUERMAN BROS., INC.**, 638 S. 28TH AVE.,  
BELLWOOD, ILL.  
Saylor Electric Prod. Corp., 277 Pierce St.,  
Birmingham, Mich.  
Scandinavian Ore Tankers, Public Ledger  
Bldg., Philadelphia 6, Pa.  
**SCHAFFER & ASSOCIATES, F. C., P.O.**  
**BOX 54, PARRAL, CHIHUAHUA, MEXICO**  
**SCHAFFER, POIDOMETER CO.**, 2825-  
SMALLMAN ST., PITTSBURGH 22, PA.  
Scharf, Heinrich G.m.b.H., Hamm (Westfalia)  
Germany  
**SCHEIDENHELM, F. W.**, 50 CHURCH ST.,  
NEW YORK 7, N.Y.  
Scheid Bantam Co., Park St., Waverly, Iowa  
Schnieder Mfg. Corp., 315 N. Franklin St.,  
Muncie, Ind.  
Schoonmaker Co. Inc., A. C., Box 516, Sauss-  
alito, Calif.  
Schramm Inc., West Chester, Pa.  
Schröter & Lockwood, 3815 Sunset Blvd., Los  
Angeles 26, Calif.  
Schwartz Mfg. Co., Lester Prairie, Minn.  
Scott's Concentrators, P.O. Box 211, Fair  
Oaks, Calif.  
Screen Equip. Co., Inc., Buffalo 25, N.Y.  
Security Engineering Div., Dresser operations,  
Inc., P.O. Box 16347, Dallas, Texas  
Seismograph Service Corp., P.O. Box 1590,  
Tulsa 1, Okla.  
Sepor Microsplitter Supply, 1845 S. Oak Park  
Ave., Berwyn, Illinois  
Service Supply Corp., 20th & Erie Ave.,  
Philadelphia 32, Pa.  
Shafte & Devol Mach. Co., 508 Newhouse Bldg.,  
Salt Lake City, Utah  
**SHAMROCK DRILLING ENTERPRISES,**  
**INC.**, 311 EL HOGAR BLDG., MANILA  
P.I.  
Sharples Chemicals Inc., 1100 Widener Bldg.,  
Philadelphia 7, Pa.  
Shawinigan Prod. Corp., 350 5th Ave., N.Y. 1,  
N.Y.  
Shedwick, Jr., Wm. J., Reforma 20-302;  
Mexico 1, D.F.  
**SHEFFIELD STEEL DIV., ARMCO STEEL**  
**CORP., SHEFFIELD STATION, KAN-**  
**SAS CITY 25, MO.**  
Shell Oil Co., 50 W. 50th St., New York  
20, N.Y.  
Shepard Niles Crane & Hoist Corp., Schuyler  
Ave., Montour Falls, N.Y.  
Sheppard Co., R. H. Hanover, Pa.  
Sherman Howard P. W., 2404 Upton Ave.,  
Spokane 13, Wash.  
Siebtechnik G.m.b.H., Bleichstr-23, Mulheim  
(Ruhr), Germany  
Siemens & Halske AG, 50 Werner-Von-Siemens-  
str., Erlangen, W. Germany  
Shrader, F. W. Co., 11623 So Broadway, Los  
Angeles 61, Calif.  
Signal Engr. & Mfg. Co., Long Branch, N.J.  
Silent Glow Oil Burner Corp., 850 Windsor  
St., Hartford, Conn.  
Silver Engineering Works, Inc., 3815 Blake  
St., Denver, Colo.  
**SIMPLEX WIRE & CABLE CO.**, 79 SIDNEY  
ST., CAMBRIDGE 39, MASS.  
Simplicity Engineering Co., 309 Oak St.,  
Durand, Mich.  
Sinclair Refining Co., 600 Fifth Ave., N.Y. 20,  
N.Y.  
**SKF Industries, Inc.**, Front St. & Erie  
Ave., P. O. Box 6751 Philadelphia 32, Pa.  
Skookum Co., Inc., 3804 N. Crawford St.,  
Portland 3, Ore.  
Sloan, DBA & Associates, 1175 Riveria Dr.,  
Pasadena, Calif.  
Smerchanaki, Mark G., 411 Childe Bldg., Win-  
nipeg, Manitoba  
**SMITH & CO., P. L.**, 11 WEST 42 ST., NEW  
YORK 36, N.Y.  
Smit & Co., Inc., Anton, 111 Eighth Ave.,  
New York 11, N.Y.  
Smit & Sons, Inc., J. K. Murray Hill, New  
Jersey  
Smith-Emery Co., 781 East Washington Blvd.,  
Los Angeles 21, Calif.

Smith & Sons (Rodley) Ltd., Thos., Rodley,  
Leeds, England  
Smith Engineering Works, 532 E. Capitol  
Drive, Milwaukee 12, Wis.  
Smith Welding Equipment Corp., 2633-4th  
St., S.E., Minneapolis 14, Minn.  
Snap-tee, Inc., 201 Titusville Rd., Union City,  
Pa.

Snell Inc., Foster D., 29 West 15th St., New  
York 11, N.Y.  
Snyders Mine & Chem. Laboratories, P. O.  
Box 212, Main St., Richland, Ore.

Socony-Vacuum Oil Co., 26 Broadway, New  
York 4, N.Y.  
Sonnenborn Sons, Inc., L., 404 Fourth Ave.,  
New York 10, N.Y.

Sorgel Electric Co., National Ave., Milwaukee  
Wis.

Soule Steel Co., 1750 Army St., San Francisco,  
Calif.

Southern Carbon Brush Co., Inc., 7 S.W. 18th  
St., Birmingham 1, Ala.

**SOUTHERN SPECTROGRAPHIC LABO-**  
**RATORY, BOX 6014, DEPT. B, DALLAS 22,**  
**TEXAS**

**SOUTHWESTERN ENGINEERING CO.**, 4808  
SANTA FE AVE., LOS ANGELES 58,  
CALIF.

Southwestern Industrial Electronics Co., Div.  
of Dresser Industries

Southern Friction Materials Co., PO Box 1475,  
Charlotte 1, N.C.

**SPANG & CO., ETNA ST., P.O. BOX 751,**  
**BUTLER, PA.**

**SPENCER CHEMICAL CO.**, 610 DWIGHT  
BLDG., KANSAS CITY, MO.

Spencer Turbine Co., 486 New Park Ave.,  
Hartford 6, Conn.

**SPRAGUE & HENWOOD, INC., BOX 446,**  
**SCRANTON 2, PA.**

Spraying Systems Co., 3201 Randolph St.,  
Bellwood, Illinois

St. Clair, John Q., 439½ Main St., Grand Junction,  
Colo.

St. Regis Paper Co., 230 Park Ave., N.Y. 17,  
N.Y.

Stahlwerke Brüninghaus G.m.b.H., Hagenerstr.  
4, Westhofen (Westf.) Germany

Stahlwerke Südwestfalen AG, Brüninghaus,  
Westhofen W. Germany

**STANCO MFG. & SALES, INC.**, 1666 NINTH  
STREET (COR. OLYMPIC BLVD.) SAN-  
TA MONICA, CALIF.

Standard Electric Mfg. Co., Inc., Haddon Ave.,  
West Berlin, N.J.

Standard Filterbau Ges. m.b.H., Loddenheide  
3, Munster Westf. W. Germany

**STANDARD OIL CO. OF CALIF. WESTERN**  
**OPERATIONS, INC.**, 225 BUSH ST., SAN  
FRANCISCO, CALIF.

Standard Oil Co. of Ind., 910 South Michigan,  
Chicago 3, Ill.

Standard Steel Corp., P.O. Box 58252 Los  
Angeles 58, Calif.

Standard Transformer Co., The, 121 Dana St.,  
Warren, Ohio

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3816 TERMINAL ANNEX, LOS ANGELES 54, CALIF.

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N.Y.

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N.Y. 6, N.Y.

Star-Kimble Motor Div.—see Miehle-Goss-Dex-

Star Wire Screen & Iron Works, Inc.,  
2515 San Fernando Road, Los Angeles 65, Calif.

Stearns Magnetic Products, 685 S. 28th St.,  
Milwaukee 46, Wis.

STEARN'S ROGER MFG. CO., 660 BANNOCK  
ST., DENVER, COLOR.

**STENBERG CORP.**, AB, DUVEDSVAGEN 17,  
STOCKHOLM-VALLINGBY, SWEDEN

**STEPHENS-ADAMSON MFG. CO.**, 13  
RIDGEWAY AVE., AURORA, ILL.

Stephenson, Robert C., Economic Geologist,  
Rm. 2500, Girard Trust Bldg., Philadel-

phia 2, Pa.

Sterling Electric Motors, Inc., 5401 Telegraph

Rd., Los Angeles 22, Calif.

Sterling Fire Alarm Co., Inc., Rochester

8, N.Y.

Stewart-Warner Corp., 1826 Diversey Parkway,  
Chicago 14, Ill.

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**& GEO. P. O. BOX 1512, RM. 24, PRES-**

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Phila., Pa.

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Spokane 4, Wash.

Stratoflex Inc., P.O. Box 10398, Fort Worth,  
Texas

Straub Mfg. Co., Inc., 2883 Baldwin St., Oak-

land 21, Calif.

Stubbe, Albert, Vlotho-Weser, Western Ger-

many

Stulz-Sickles Co., 929-939 Port Ave., Elizabeth,  
N.J.

**STURTEVANT MILL CO.**, 157 CLAYTON

ST., DORCHESTER, BOSTON 22, MASS.

Superior Carbon Prod., Inc., 9115 George Ave.,  
Cleveland 5, Ohio

Superior-Lidgerwood-Mundy Corp., 1101 John

Ave., Superior, Wisconsin

**SUPERIOR-LIDGERWOOD-MURPHY, 100**  
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**CALIF.**

Surface Combustion Corp., Pelletizing Div.,  
2375 Dorr Street, Toledo 1, Ohio

Sutorbilt Corp., 2008 E. Siawson Ave., Los Angeles 58, Calif.

Suphen, Peter O., Box 58, Everett, Pa.

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Sweden

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Sweden

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Medina, N.Y.

Swift & Co., Technical Prod. Plant, 1800 165th

St., Hammond, Ind.

Symons Bros. Co., 11551 Hart St., P.O. Box

770, No. Hollywood, Calif.

**SYNTRON CO.**, 166 LEXINGTON AVE.,  
HOMER CITY, PA.

## T

Talbot, H. L., Rm. 331, 84 State St., Boston 9,  
Mass.

Talcott, Inc., W.O. & M.W., Box 1307, Providence,  
R.I.

Tamping Bag Co., Div., Pickard Industries,  
Inc., 218 S. Third St., Mt. Vernon, Ill.

Tate Mine Development & Supply Co., 2438  
No. Kelvin Blvd., Tucson, Ariz.

Taylor Forge & Pipe Works, P. O. Box 485,  
Chicago 90, Ill.

Taylor-Wharton Iron & Steel Co., High  
Bridge, N.J.

Techn. Ind. en Handelsonderneming, 81-89  
Weteringschans, Amsterdam C, Netherlands

Technical Assoc., 140 W. Providencia Ave.,  
Burbank, Calif.

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AVE., DURANGO, COLO.

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Float Div., 100 Park Ave., New York 17,  
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Texas Instruments, Inc., 6000 Lemmon Ave.,  
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Texas Instruments, Inc., Industrial Instrumentation  
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ver 18, Colo.

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cago, Ill.

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ington 6, D.C.

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ship Ave., Cincinnati 16, Ohio

Torit Mfg. Co., 292 Walnut St., St. Paul 2,  
Minn.

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Ill.

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Albert St., Youngstown 1, Ohio

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 Tyson Bearing Corp., Oberlin Rd., Massillon, Ohio

## U

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 Union Carbide & Carbon Corp., Haynes Stellite Div., 725 S. Lindsay St., Kokomo, Ind.  
 Union Carbide & Carbon Corp., Linde Air Prod. Div., 30 E. 42nd St., New York 17, N.Y.  
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 Union Oil Co. of Calif., 617 W. 7th St., Los Angeles 17, Calif.  
 Union Wire Rope Corp., 21st & Manchester Ave., Kansas City 26, Mo.  
 Unit Crane & Shovel Corp., 6411 W. Burnham St., Milwaukee 19, Wis.  
 United Geophysical Corp., Box M, Pasadena, Calif.  
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 U. S. Hoffman Mach. Corp., 103-4th Ave., N. Y. 3, N.Y.  
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 U. S. Instrument Corp., P. O. Box 470 Charlottesville, Va.  
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 United States Rubber Intl., 1230 Ave. Americas, N.Y. 20, N.Y.  
 U. S. Safety Service Co., 1215 McGee St., Kansas City, Mo.  
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 U. S. Steel Corp., Columbian-Geneva Steel Div., 120 Montgomery St., San Francisco 6, Calif.  
**U. S. STEEL EXPORT CO.**, 30 CHURCH ST., NEW YORK 8, N.Y.  
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 Uranium Exploration, Fidelity Bldg., Spokane 1, Wash.  
 Uranium Exploration, P.O. Box 223, Norwood Colo.  
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 Utah Fire Clay Co., P.O. Box 127, Salt Lake City, Utah  
 Utility Mine Equip. Co., 1010 Collingwood Rd., St. Louis 24, Mo.

## V

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 Victor Equipment Co., 844 Folsom St., San Francisco 7, Calif.  
 Victoreen Instrument Co., 5806 Hough Ave., Cleveland 3, Ohio  
 Voland & Sons, Inc., P. O. Box 680, New Rochelle, N.Y.  
 Vulcan Electric Co., 88 Holten St., Danvers, Mass.  
 Vulcan Foundry Co., 4401 San Leandro St., Oakland, Calif.  
 Vulcan Iron Works, Co., 730 S. Main St., Wilkes-Barre, Pa.  
**VULCAN IRON WORKS CO.**, THE 2960 SO. FOX ST., ENGLEWOOD, COLORADO

## W

Wadsworth Electric Mfg. Co., Covington, Ky.  
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**WAH Chang Mining Corp.**, Woolworth Bldg., 223 Broadway, New York 7, N.Y.  
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**WARN MFG. CO., INC.**, BOX 6064, 18821 PACIFIC HIGHWAY, SEATTLE, WASH.  
 Washington Iron Works, 1520 6th Ave. S., Seattle 4, Wash.  
 Washington Machinery Co., 7329 East Marginal Way, Seattle 8, Wash.  
 Watlow Electric Mfg. Co., 1376 Ferguson Ave., St. Louis 14, Mo.  
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 Wellman Engineering Co., 7000 Central Ave., Cleveland 4, Ohio  
 Wesche Electric Co., 1622 Vine St., Cincinnati 10, Ohio  
 Wesserhutte Otto Wolff G.m.b.H., Bad Oeynhausen, W. Germany  
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 Western Foundry Co., 2400 S. W. Water Ave., Portland 1, Ore.  
 Western Gear Corp., P.O. Box 182, Lynwood, Calif.  
 Western Gear Corp., 417-9th Ave., So. Seattle 4, Wash.  
 Western Gear Corp., Pacific Gear Plant, 1035 Folsom St., San Francisco, Calif.  
 Western Insulated Wire Co., 2425 E. 30th St., Los Angeles 55, Calif.  
 Western-Knapp Engr. Co., 650-5th St., San Francisco Calif.  
**WESTERN MACHINERY CO.**, 650-5TH ST., SAN FRANCISCO 7, CALIF.  
**WESTERN PRECIPITATION CORP.**, 1000 W. 9TH ST., LOS ANGELES 15, CALIF.  
 Western Radiation Lab., 1107 W. 24th St., Los Angeles 7, Calif.  
**WESTERN ROCK BIT MFG. CO.**, 552 WEST 7TH SOUTH ST., SALT LAKE CITY 4, UTAH

Westfälische Maschinenbau G.m.b.H., Zechenstrasse 5-9, Unna, Westf., Germany  
 Westfall Equipment Co., 437 No. Columbia Blvd., Portland 11, Ore.  
 Westinghouse Air Brake Co., Cleveland Rock Drill Div., Cleveland, Ohio  
 Westinghouse Air Brake Co., Ind. Products Div., P.O. Box 26, Wilmerding, Pa.  
 Westinghouse Air Brake Co., Le Roil Div., 3716 W. Wisconsin Ave., Milwaukee, Wis.  
 Westinghouse Electric Corp., P.O. Box 865, 3 Gateway Center Ave., Pittsburgh 30, Pa.  
 Westinghouse Electric Corp., W. 58th St., Cleveland 2, Ohio

Westinghouse Electric Corp., Lamp Div., Bloomfield, N.J.  
 Westinghouse Electric Co., Sturtevant Div., Hyde Park, Boston 36, Mass.  
**WESTINGHOUSE ELECTRIC INTERNATL CO.**, 40 WALL ST., NEW YORK 5, NEW YORK  
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 Westvaco Chemical Div., Food Machinery & Chem. Corp., 161 E. 42nd St., New York 17, N.Y.  
 Wheelabrator Corp., 1407 S. Byrit St., Mishawaka, Ind.  
 Wheel Trueing Tool Co., 3200 W. Davison Ave., Detroit 38, Mich.  
 Wheeler Instrument Div., Barber-Colman Co., 1300 Rock St., Rockford, Ill.  
 White Instrument Co., David 2051 N. 19th St., Milwaukee 12, Wis.  
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 White's Electronics, 1218 Main St., Sweet Home, Ore.  
**WILD HEERBRUGG INSTRUMENTS, INC.**, MAIN & COVERT ST., PORT WASHINGTON, N.Y.  
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 Wilfley, Clifford R., 2233 Grape St., Denver, 7, Colo.  
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 Williams, I. B., & Sons, 51 Washington St., Dover, N.H.  
 Williams Bucket Div., McDowell Co., Inc., The Williams Crusher & Pulverizer Co., 2761 N. Broadway, St. Louis, Mo.  
 Willson Products Div., Ray-O-Vac Co., 2nd & Washington Sts., Reading, Pa.  
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 Wilmet Engineering Co., Whitehaven, Pa.  
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**WINTER-WEISS CO., THE**, 2201 BLAKE ST., DENVER 5, COLO.  
 Wire Rope Corp., of America, Inc., 609 N. 2nd St., St. Joseph, Mo.  
 Wisconsin Motor Corp., 1910 S. 53rd St., Milwaukee 46, Wis.  
**WISSEY & COX**, 55 NEW MONTGOMERY ST., SAN FRANCISCO, CALIF.  
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 Wolf, Harry J., One Park Place, New York 7, N.Y.  
 Wolf Safety Lamp Co. of Amer., Inc., 227 Grand Ave., Brooklyn 5, N.Y.  
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**WOOD & CO. LTD.**, HUGH, DASHWOOD HOUSE, 69 OLD BROAD ST., LONDON, E.C. 2, ENGLAND  
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 World Mining Consultants, Inc., 220 Broadway, N.Y. 38, N.Y.  
 World Wide Aerial Surveys (Aust.) Pty. Ltd., 52 Wentworth Ave., Mascot, Sydney, Australia  
 Worthington Corp., 421. Worthington Ave., Harrison, N.J.  
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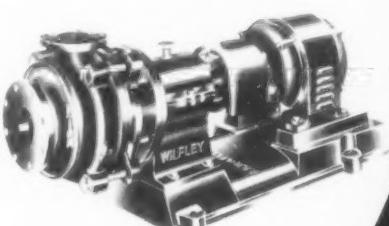
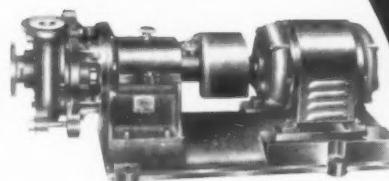
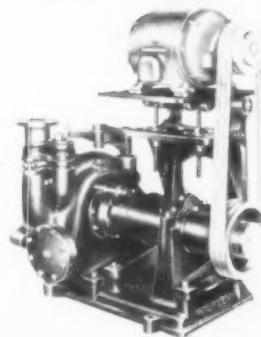
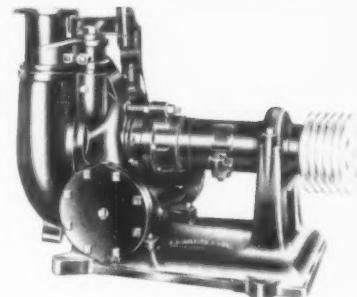
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